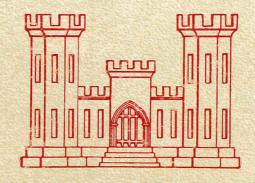
FORT HOOD, TEXAS TERRAIN ANALYSIS



PREPARED BY

64TH ENGINEER DETACHMENT (TERRAIN)

FORT HOOD, TEXAS 76544

PRINTED BY

524TH ENGINEER COMPANY (TOPO)

FORT HOOD, TEXAS 76544

UNDER THE DIRECTION OF
THE TERRAIN ANALYSIS CENTER

U.S. ARMY ENGINEER TOPOGRAPHIC LABORATORIES
FORT BELVOIR, VIRGINIA 22060

JULY 1977

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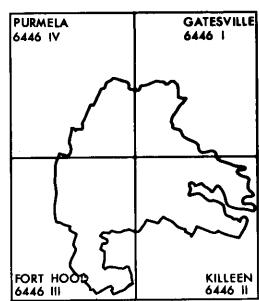
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FORT HOOD, TEXAS

TERRAIN ANALYSIS

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FORT BELVOIR, VIRGINIA 22060

I. INTRODUCTION

BACKGROUND

The requirement for this terrain analysis was stated in message P 241854 Z Oct 75, from Commander, FORSCOM to the Office of Chief of Engineers (OCE), Department of Army, subject; "Terrain Analysis of Selected FORSCOM Installations." The message identified several installations, including Fort Hood, and cited the topical coverage desired in the study. The Terrain Analysis Center (TAC) of Engineer Topographic Laboratories (ETL), Fort Belvoir, Virginia, was tasked by OCE with management and supervision of the overall project.

Message R 191435 Z Jan 76 from Commander, FORSCOM to OCE tasked the 64th Engineer Detachment (Terrain), Fort Hood, Texas, to perform the terrain analysis of Fort Hood in the January 1976 - June 1977 time frame, and the 524th Engineer Company (Topo) was tasked with cartographic and reproduction support in that time frame.

The scope and content of the topical coverage of the FORSCOM requirement were developed jointly between TAC and FORSCOM representatives. Analytical and cartographic specifications were developed by TAC, coordinated with OCE, and concurred in by FORSCOM Headquarters.

PURPOSE

In the requirement for installation terrain analysis stated by FORSCOM, it was indicated that the purpose of the program was to aid military planners in future stationing decisions. A major factor in this decision process includes a knowledge of the suitability of terrain. Exercises involving maneuverability are dependent on such factors as soils, slope, vegetation, drainage, and surface configuration.

Certain statistical information on off-post areas is also desirable when planning troop stationing: Information on housing, schools, hospitals and public utilities in areas near installations along with airfields and ports in the vicinity are treated.

SCOPE

This terrain analysis is a condensation of available data on the pertinent natural and manmade features of the Fort Hood Reservation and an evaluation of their effects on tactical military operations. Extensive "ground truthing" was utilized by the analysts in an effort to paint as accurate a picture as possible. The majority of the investigative work, however was documented by other agencies and authenticated through field checks.

The analysis of such factors as vegetation cover, cover and concealment, water resources, and cross-country movement involved analytical judgment on the part of the analyst involved, and this judgement is by nature often a subjective feel for the terrain based on objective facts.

LIMITATIONS

Since the study is basically a condensation of available data, there are necessarily limitations to the accuracy and level of use. The graphic scale precluded inclusion of extremely detailed work. Extensive use of remote sensed imagery, field interviews, and questionnaires to urban areas was employed.

The level of presentation of the study would support tactical operations planning at the brigade, and in some instances battalion level. This is not to say the scale of the study precludes use at lower levels. Some information has been compiled at large scales such as vegetation and surface drainage, but other factors vary in degree of presentation.

PRESENTATION

Maximum use of graphic portrayal of topics is employed where practical. Supporting text when applicable is presented in tabular format keyed to the related graphics which follow. Map scale for most topics is 1:50,000. For Urban Areas (Cantonment Areas), the scale is approximately 1:5,000, and the Off-Post Feature map scale is 1:1,000,000.

STUDY AREA

The Fort Hood Military Reservation is located near the geographical center of Texas in Bell and Coryell counties. Fort Hood consists of a total area of 217,000 acres. Located 100 Km north of Austin and 200 Km south of Dallas, the center of mass of the reservation is located approximately at 31°08' north latitude, and 97°46' west longitude. Fort Hood is accessible from U.S. highway 190, which extends east-west through the reservation, and is the main entrance into the installation. Interstate 35 runs north-south about 35 Km east of Fort Hood, and U.S. highway 281, also north-south, is about 45 Km west of the post.

Physiographically, fort Hood lies near the southeastern margin of the Comanche Plateau, west and north of the inner edge of the Gulf Coastal Plain. The margins of this plateau are eroded predominately in a northwest to southeast direction resulting in elongated valleys and hills with local relief not exceeding 111 meters. Consequently, Fort Hood occupies this transition between plateau and coastal plain. Cowhouse Creek and Leon River are the main watercourses on the reservation. Several small tributaries add additional water to the moderate flow of the Cowhouse and Leon. The small flood plains of these rivers are generally covered by the densest vegetation on the post.

Much of Fort Hood has a modest cover of juniper trees and live oak, rarely reaching over 7 or 8 meters in height. Summers are hot and winters are generally mild with the exception of a few weeks when sub-freezing temperatures and high winds are present; snow fall of appreciable amounts is not common. Most of the rainfall occurs in spring and late summer during thunderstorms.

II. DESCRIPTION AND MILITARY ASPECTS OF TERRAIN

A. SURFACE CONFIGURATION

Fort Hood Military Reservation lies near the southeastern margin of Comanche Plateau west and north of the inner edge of the Gulf Coastal Plain. The surface configuration is predominantly the result of erosion of limestones and shales by small-to-moderate-size streams flowing generally southeasterly from the Plateau onto the Plain; the over-all drainage pattern is dendritic. Dissection of the Plateau on Fort Hood is less severe than that in the higher areas to the west. Landforms consist of rolling and dissected plateau remnants with numerous mesa-like hillocks and ridges bounded by steep slopes, flat to gently rolling lower plains, the flood plain of Cowhouse Creek, and a small area of clayey plain near the southwesternmost corner of the Reservation. Much of the reservation is below an elevation of 250 m (850 ft); higher elevations are in the western part of the reservation. Flood plains have the least slope, generally 0 - 3%; bluffs along drainageways and steep escarpments rising to the mesa-like hillocks may exceed 45%.

| LANDFORM TYPE | LANDFORM DESCRIPTION AND DISTRIBUTION | ELEVATIONS |
|---------------|---|---|
| Low Plains | Generally flat to gently rolling plains dissected by numerous intermittent streams in incised valleys. Gently rolling plains predominate and are located in all parts of the reservation with the largest continuous area stretching across the southern part; local relief or the distance between interstream areas and adjacent valley bottoms largely between 25 and 50m (80 and 164'ft); slopes commonly between 3 and 10% except along valley sides where 10 to 25% slopes are common in lower courses and 25 to 45% in upper reaches; in places, valley slopes exceed 45%, particularly in upper reaches of valleys. Flattest plains stretch along Cowhouse Creek from the northwest to the southeast across the center of the reservation and along the Leon River in the northern part; local relief of these flood plains is generally less than 5m (16 ft) and slopes generally less than 3%. | Lowest elevation, 181m (594 ft) above sea level, is at the confluence of the Cowhouse Creek and Belton Reservoir at PK299527. Highest elevation, 318m (1045 ft), is located at PK047499. |
| High Plains | Primarily gently rolling to rolling and dissected plains with numerous mesa-like or flat-topped hillocks scattered throughout; largest continuous area of mesa-like hillocks are in the northern part of the reservation. Highest local relief, up to 111m (364 ft) is in the area of the mesa-like hillock (Smith Mountain) just west of Belton Reservoir; slopes along upper edges reach over 45%, while nearly flat summit areas with slopes mainly 3 to 10%. Escarpments with slopes greater than 60% form the upper edges of many of these mesa-like hillocks. Two other areas of mesa-like hillocks with high local relief, 100m (328 ft) on the southwesternmost edge of the reservation (Seven Mile Mountain) and 106m (347 ft) in the central part (Jacks Mountain Ranges); slopes are similar to the Smith Mountain area. Gently rolling to rolling and dissected plains, comprising the remainder of landforms on the reservation, have local relief mainly between 50 and 90m (164 and 295 ft) with slopes largely between 10 and 25% and fairly large interfluve areas from 3 to 10%; valley sides, particularly in the upper reaches of streams, commonly with slopes 25 to 45% and in many places exceeding 45%. | Lowest elevation, 205m (670 ft) above sea level, is along the Leon River at PK281678. Highest elevation, 375m (1230 ft) above sea level, is located on Seven Mile Mountain (PK080383); flat-topped summits of mesa-like hillocks all have approximately the same elevation, from 290m (950 ft) to 375m (1230 ft). |

B. SURFACE DRAINAGE

All of the surface water of Fort Hood drains southeastward into the Leon River. The major perennial tributaries to the Leon River on the reservation are Cowhouse Creek and North Nolan Creek; the remainder of the streams are intermittent and have not been treated in this study. Many of the streams have been dammed, thus forming numerous small man-made reservoirs or lakes throughout the reservation.

Although the Leon River does not cut through the reservation, its southern bank constitutes a part of the reservation boundary. The bank is moderately steep and composed mainly of silt and clay. The Leon River has a very broad flood plain which is mostly off the reservation.

The heaviest streamflow on the Fort Hood reservation occurs in the months of April and May. The average rainfall during this period, approximately 22 cm (8.7 in), verifies the fact that this is the wettest time of the year.

The Average Streamflow table, below,illustrates a 25 year average of monthly stream discharges and indicates a trend of high and low water periods. However, on a year to year basis, there is great variability in the duration, time of onset, and end of the high water period. Severe storms may cause unusually high water levels at almost anytime of the year. Average discharge measurements for this area show May to be the high-discharge month and July to be the beginning of the low-discharge period.

The U.S. Geological Survey has mapped flood-prone areas in the Fort Hood area delineating areas that have a 1 to 100 chance on the average of being inundated during any year. The broad flat flood plains along the Leon River and Cowhouse Creek are subject to flooding. The flood plain along North Nolan Creek is moderately controlled by Soil Conservation Service flood-prevention dams along the creek.

| DRAINAGE CATEGORIES | GENERAL | REGIME | WIDTHS | DEPTHS | VELOCITY AND DISCHARGE | BANKS | ВОТТОМ |
|--------------------------|--|---|--|--|---|--|--|
| <u>Principal Streams</u> | | | | | | | |
| Leon River | Perennial stream, meanders south-easterly along the northern boundary of the Reservation. Broad flood plain, mostly off Reservation. | High water: March through May, Low water: July through Sept- ember. | Enters Reservation at PK 215723 and is 20m (65 ft) wide and reaches 25m (82 ft) wide at PK 249723. From this point to exit from post, widths largely between 25 and 40m (82 and 131 ft). | imum high stage, 10m (32 ft) has | 0.3 m/sec (0.9 ft/sec). During high water, | Predominantly greater than 55% side slope composed of silts and clays. Soils on bank are deep, very few isolated areas with gravel or rock fragments. | Predominantly silt and clay mostly soft with very gradual gradient. May be as much as Im (3.3 ft) thick in less turbulent segments |
| Cowhouse Creek | Perennial stream, meanders through the center of the Reservation from the northwest to southeast. Presents a potential flood hazard. | High water: March through May. Low water: July through Sep- tember. | Largely be- tween 15m (49 ft) wide on entry to reservation to 25m (82 ft) wide at PK 174533; from this point to exit from post widths range be- tween 25 and 100m (82 and 328 ft). | Mean depth of about 0.5m (1.5 ft). Low water stage generally ranges from 0 to 0.3m (1 ft). Maximum stage recorded was 12.3m (40.1 ft) on 4 October 1959 at Pidcoke gaging station at northwest reservation boundary. | Normally, estimated velocities range from 0.5 m/sec (1.6 ft/sec) to 0.9 m/sec (2.7 ft/sec). During high water, velocity range from 0.75 m/sec (2.5 ft/sec) to 3.2 m/sec (10.5 ft/sec). At low water, velocity range from 0 to 0.4 m/sec (1.3 ft/sec). The mean discharge at the Pidcoke gage station is 5.8 m ³ /sec (133 mgpd) while at high water, discharge is 62.14 m ³ /sec (1,413 mgpd) and at low water discharge is 0.0001 m ³ /sec (0.0022 mgpd). | Predominantly greater than 50% side stope with very little soil covering. Shallow soils consists of silt and clay. Large areas of exposed rock outcrops. | little soil covering. Large areas of gravel. Small isolated seg- |

3. SURFACE DRAINAGE (Continued)

| DRAINAGE CATEGORIES | GENERAL | REGIME | WIDTHS | DEPTHS | VELOCITY AND DISCHARGE | BANKS | BOTTOMS |
|---------------------------------|--|--|---|--|---|---|---|
| North Nolan Creek | Perennial stream, meanders through the lower south-eastern section of the Reservation. | High water: March through May. Low water: July through Aug- ust. | Variable widths throughout; as narrow as 2.5m (8.3 ft) at PK 357453 to as wide as 10m (33 ft) at PK 376445. | Mean depth varies from 0.2 m (0.7 ft) to 0.5 m (1.5 ft). Low water stage generally ranges from 0 to 0.2m (0.7 ft). High water stage generally ranges from 1.5m (5 ft) to 3.1m (10 ft). | Normally estimated velocities range from 0.5 m/sec (1.6 ft/sec) to 0.9 m/sec (2.7 ft/sec). During high water, velocities range from 0.75 m/sec (2.5 ft/sec) to 3.2 m/sec (10.5 ft/sec). At low water, velocities range between 0 and 0.4 m/sec (1.3 ft/sec). The mean discharge is 4.06 m ³ /sec (92.3 mgpd). At high water, the discharge is approximately 208 m ³ /sec (4,720 mgpd) and at low water, discharge is approximately 0.0001 m ³ /sec (0.002 mgpd). | Predominantly greater than 30% side slope composed pre- dominantly of shallow silt and clay. Very little rock outcrops along Nolan Creek. | Predominantly silt and clay; very shallow; mostly less than 0.5m (1.7 ft). Limestone bed- rock is occas- ionally exposed. |
| Reservoirs and Lakes | | | | | | Clay with small | Very soft clay |
| I. Pershing Lake (174429) | Approximately 14 ha (35 Ac). Capacity of 246,362 m ³ (199 Ac-ft). Earth fill dam with concrete pipe spillway outlet and a riser with trash rack. Has a sodded emergency overflow spillway. Dam height 14 m (48 ft). | | About 687 m (2250 ft) long and 534 m (1749 ft) wide. | | | percentage of rock fragments. | and silt bottom. |
| 2. Larned Lake (319478) | Approximately 8.9 ha (22 Ac). Capacity of 184,300 m ³ (149 Ac-ft). Earth fill dam with a sodded emergency overflow spillway. Dam height 17 m (57 ft). | | About 817 m (2678 ft) long and 246 m (806 ft) wide. | | | Clay and silt with a large percentage of rock fragments. | Rocky clay overlain by a thin layer of silt. |
| 3. Notan Lake (369446) | Approximately 9. ha (24 Ac). Capacity of 205,508 m ³ (166 Ac-ft). Earth fill dam with concrete pipe spillway outlet with trassiguard. Emergenci overflow spillway Dam height 18 m (60 ft). | - h y | About 1047 m (3432 ft) long and 246 m (806 ft) wide. | | | Clay and silt with a large percentage of rock fragments. | Rocky clay overlain by a thin layer of silt. |
| 4. Engineer Lake (277476) | Approximately 13 ha (33.2 Ac). Cacity of 283,502 m ³ (229 Ac-ft). Earth fill dam wa sodded overflospillway. Dam height 10 m (33 | cap- cith ow | About 666 m (2184 ft) long and 325 m (1066 ft) wide. | | | Clay and silt with a large percentage of rock fragments Numerous areas of rock outcro | |
| 5. Airfield Lake (239458) | Approximately 8. ha (20 Ac). Cap acity of 85,422 m³ (69 Ac-ft). Earth fill dam with concrete pipe spillway outlet with tras guard. Emergence sodded overflow spillway. Dam height 8 m (27 | sh cy | About 556 m (1820 ft) long and 31! m (1020 ft) wide. | | | Clay and silt with a small percentage of rock fragments | Very soft clay and silt bottom. |
| 6. Heiner Lake (326449) | Approximately 4 ha (12 Ac). Capacity of 103,993 m ³ (84 Ac-ft). Earth fill dam with a pipe spillway outlet Emergency sodder overflow spillway Dam height 7.6 (25 ft). | .9 p- 2 | About 587 m (1924 ft) long and 214 m (702 ft) wide. | | | Clay and silt with a small percentage of rock fragments | Soft clay and silt bottom. |
| 7. Unnamed (071472) | Approximately I ha (3.8 Ac) sur area. Capacity 33,302 m ³ (27 A Earth fill dam a sodded emerge spillway. Dam height 5.8 m (I ft). | face of c-ft). with ncy | About 206 m (674 ft) long and 77 m (253 ft) wide. | | | Clay and silt with a few rock outcrops. | Rocky bottom overlain by a thin layer of silt. |

4

B. SURFACE DRAINAGE (Continued)

| DRAINAGE CATEGORIES | GENERAL | REGIME WIDTHS DE | EPTHS VELOCITY AND DISCHARGE | BANKS | воттом |
|--|--|--|------------------------------|--|---|
| 8. Unnamed (161661) | Approximately 1.5 ha (3.9 Ac) surface area. Capacity of 33,302 m ³ (27 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 5.5 m (18.0 ft). | About 197 m (646 ft) long and 120 m (393 ft) wide. | | Clay and silt with a small percentage of rock fragments. | Clay and silt with small percentage of rock fragments. In places bedrock overlain by a tayer of silt. |
| 9. Unnamed (178665) | Approximately 1.2 ha (3 Ac). Capacity of 29,712 m ³ (24 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 6.5 m (21.3 ft). | About 163 m (534 ft) long and III m (365 ft) wide. | | Clay and silt with a small percentage of rock fragments. A few rock outcrops. | Clay and silt with small percentage of rock fragments. In places bedrock overlain by a layer of silt. |
| 10. Unnamed (082468) | Approximately 2.0 ha (5 Ac). Capacity of 58,186 m ³ (47 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 8.7 m (28.5 ft). | About 322 m (1053 ft) long and 161 m (527 ft) wide. | | Clay and silt with a small percentage of rock fragments. Small number of rock outcrops. | Very rocky bottom with a thin layer of silt. |
| 11. Unnamed (148693) | Approximately 1.2 ha (3 Ac). Capacity of 26,617 m3 (22 Ac- ft). Earth fill dam with a sodded emer- gency spillway. Dam height of 5.3 m (17.3 ft). | About III m (365 ft) long and 120 m (393 ft) wide. | | Clay and silt with a small percentage of rock fragments. | Clay and silt; small percentage of rock outcrops overlain by a layer of silt. |
| 12. Starnes Lake #1 (071513) | Approximately 2.1 ha (5.1 Ac). Cap- acity of 43,330 m ³ (35 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 9 m (29 ft). | About 335 m (1098 ft) long and 163 m (535 ft) wide. | | Clay and silt with a small percentage of rock outcrops. | Clay and silt; a few rock out- crops overlain by silt. |
| 13. Starnes Lake #2 (072507) | Approximately 1.0 ha (2.6 Ac). Cap-acity of 22,284 m ³ (18 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 8.7 m (28 ft). | About 129 m (422 ft) long and 112 m (366 ft) wide. | | Clay and silt with a large percentage of rock fragments. Some rock outcrops. | Soft clay and silt bottom with a small percentage of rock fragments. |
| 14. Copperas Cove Lake #2 (093467) | Approximately 4.7 ha (11.6 Ac). Capacity of 99,000 m ³ (80 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 10.7 m (35 ft). | About 550 m (1802 ft) long and 232 m (760 ft) wide. | | Clay and silt with a small percentage of rock fragments. | Soft clay and silt. |
| 15. Copperas Cove Lake # I (†18455) | Approximately 8.7 ha (21.3 Ac). Capacity of 181,986 m ³ (147 Ac-ft). Earth fill dam with a pipe spillway and a sodded emergency spillway. Dam height of 12.2 m (40 ft). | About 824 m (2702 ft) long and 283 m (929 ft) wide. | | Clay and silt with a very small percentage of rock fragments. | Soft clay and silt. |
| 16. Copperas Cove Lake # 3 (083459) | Approximately 6.6 ha (16.3 Ac). Capacity of 139,238 m ³ (112.5 Ac-ft). Earth fill dam with a sodede emergency spillway. Dam height 7.0 m (23 ft). | About 531 m (1742 ft) long and 197 m (646 ft) wide. | | Clay and silt with a very small percentage of rock fragments. | Soft clay and silt. |
| 17. Belton Reser- voir (Borders Reservat- ion on the east) | Approximately 4,932 ha (12,300 Ac) surface area. Capacity of 566,510,000 m ³ (457,600 Ac-ft). Earth fill dam with an uncontrolled emergency spillway. Dam height 59 m (192 ft). | About 24.2 km (15 mi) long and 2.6 km (1.6 mi) wide. | | Clay, silts, and sands. A large number of rock out- crops. Areas of very steep slopes. | Areas of rock outcrops and small percentage of rock fragments overlain by silt. Some areas of soft silt and clay. |
| 18. Henson Lake (118668) | Approximately 1.5 ha (3.8 Ac). Capacity of 32,188 m ³ (26 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 5.2 m (17 ft). | About 180 m (590 ft) long and 154 m (507 ft) wide. | | Clay and silt with a small percentage of rock fragments. | Soft silt. |
| 19. Hubbard Lake (268596) | Approximately 4.5 ha (II Ac). Cap-acity of 94,088 m ³ (76 Ac-ft). Earth fill dam with a sodded emergency spillway. Dam height 9.8 m (32 m). | About 180 m (416 ft) long and 111 m (364 ft) wide. | | Very shallow clay and silt with a small percentage of rock fragments. | Soft clay and silt with a small percentage of rock' fragments in places, bedrock overlain by silt. |
| 20. Eister Lake (128602) | Approximately 2.7 ha (6.6 Ac). Cap-acity of 56,948 m ³ (46 Ac-ft). Earth fill dam with a pipe spillway outlet and a sodded emergency spillway. Dam height 5.5 m (18 ft). | About 403 m (1321 ft) long and 137 m (450 ft) wide. | | Clay and silt with a small percentage of rock fragments. Some rock out-crops. | Clay and silt with a small percentage of rock fragments. Some rock outcrops overlain with a layer of silt. |

SURFACE DRAINAGE (Continued)

AVERAGE STREAMFLOW

AVERAGE MONTHLY DISCHARGE IN MILLION GALLONS PER DAY

1950 to 1974

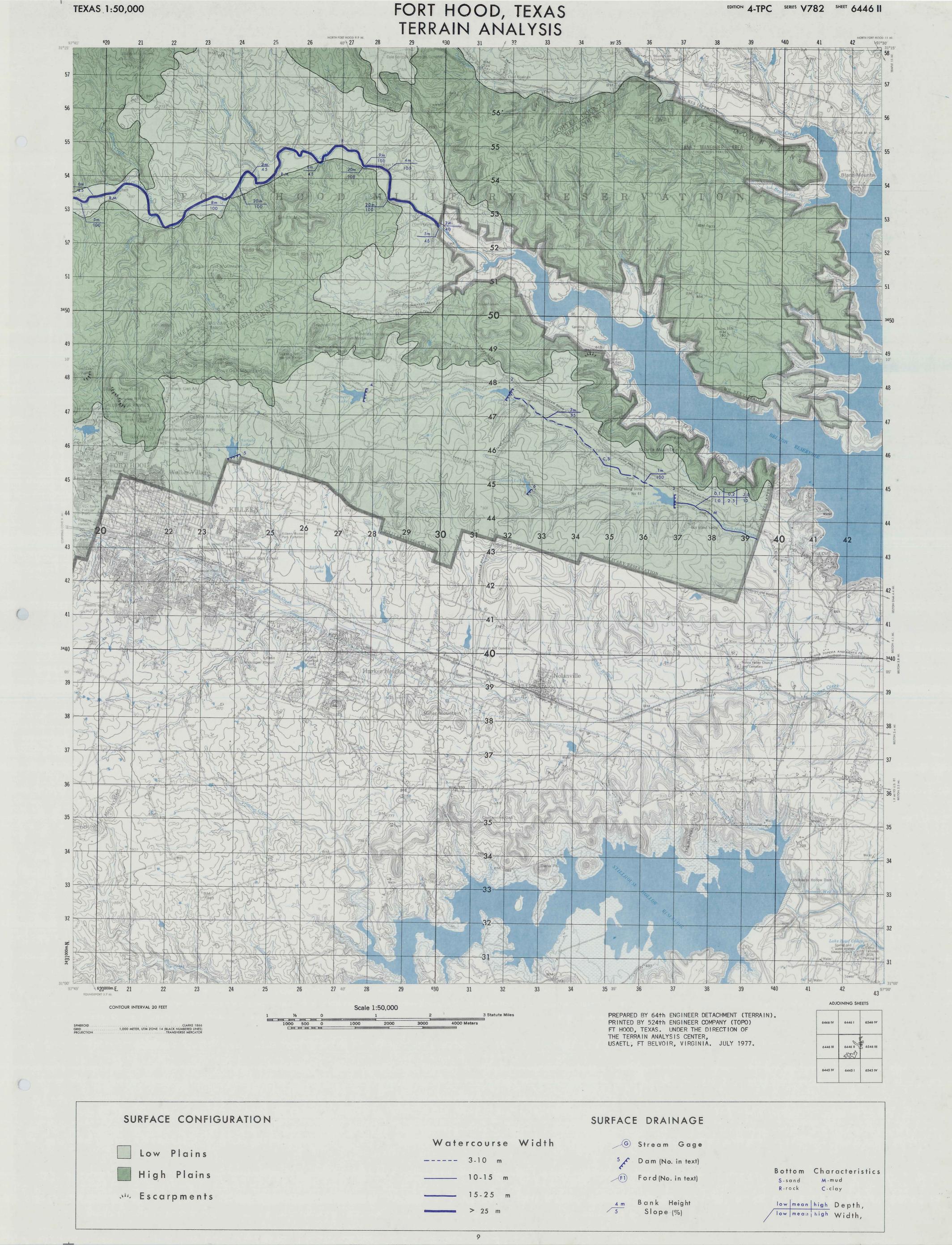
| Leon River at Gatesville | | | | Leon R | Leon River at Belton Dam | | Cowhou | se Creek at P | dcoke | |
|--------------------------|-----------|-----------|-----------|-----------|--------------------------|-----------|-----------|---------------|-----------|--|
| Month | 1950-1959 | 1960-1969 | 1970-1974 | 1950-1959 | 1960-1969 | 1970-1974 | 1951-1959 | 1960-1969 | 1970-1973 | |
| January | 23.78 | 296.18 | 109.01 | 42.79 | 439.84 | 212.24 | 6.30 | 124.23 | 40.66 | |
| February | 39.01 | 328.62 | 74.40 | 47.29 | 534.74 | 79.05 | 23.22 | 99.89 | 42.47 | |
| March | 70.79 | 185.37 | 253.25 | 229.79 | 621.69 | 360.83 | 29.59 | 74.28 | 124.19 | |
| April | 213.26 | 241.65 | 167.78 | 114.61 | 519.18 | 451.55 | 98.99 | 64.86 | 68.92 | |
| May | 894.70 | 548.01 | 149.37 | 871.39 | 587.82 | 427.08 | 243.22 | 208.19 | 61.26 | |
| June | 157.40 | 266.86 | 82.09 | 527.13 | 876.73 | 391.92 | 27.50 | 48.87 | 48.68 | |
| July | 53.26 | 482.22 | 74.17 | 506.96 | 481.63 | 65.69 | 4.88 | 23.35 | 64.79 | |
| August | 11.33 | 72.25 | 24.05 | 56.13 | 287.32 | 60.52 | 8.27 | 29.93 | 6.20 | |
| September | 32.33 | 138.46 | 89.43 | 54.19 | 169.71 | 71.39 | 7.59 | 34.83 | 76.55 | |
| October | 355.29 | 161.26 | 152.80 | 412.20 | 269.65 | 163.74 | 137.28 | 51.04 | 79.15 | |
| November | 73.64 | 116.50 | 64.77 | 360.64 | 225.01 | 94.03 | 23.49 | 51.61 | 19.04 | |
| December | 46.08 | 97.63 | 131.67 | 150.16 | 255.55 | 140.51 | 20.86 | 49.71 | 66.08 | |
| Average | 164.23 | 244.58 | 114.39 | 281.11 | 439.07 | 209.88 | 52.60 | 71.73 | 57.17 | |
| _ | | | | | | | | | | |

FLOOD PEAKS OVER 600 MGPD (Million Gallons Per Day)

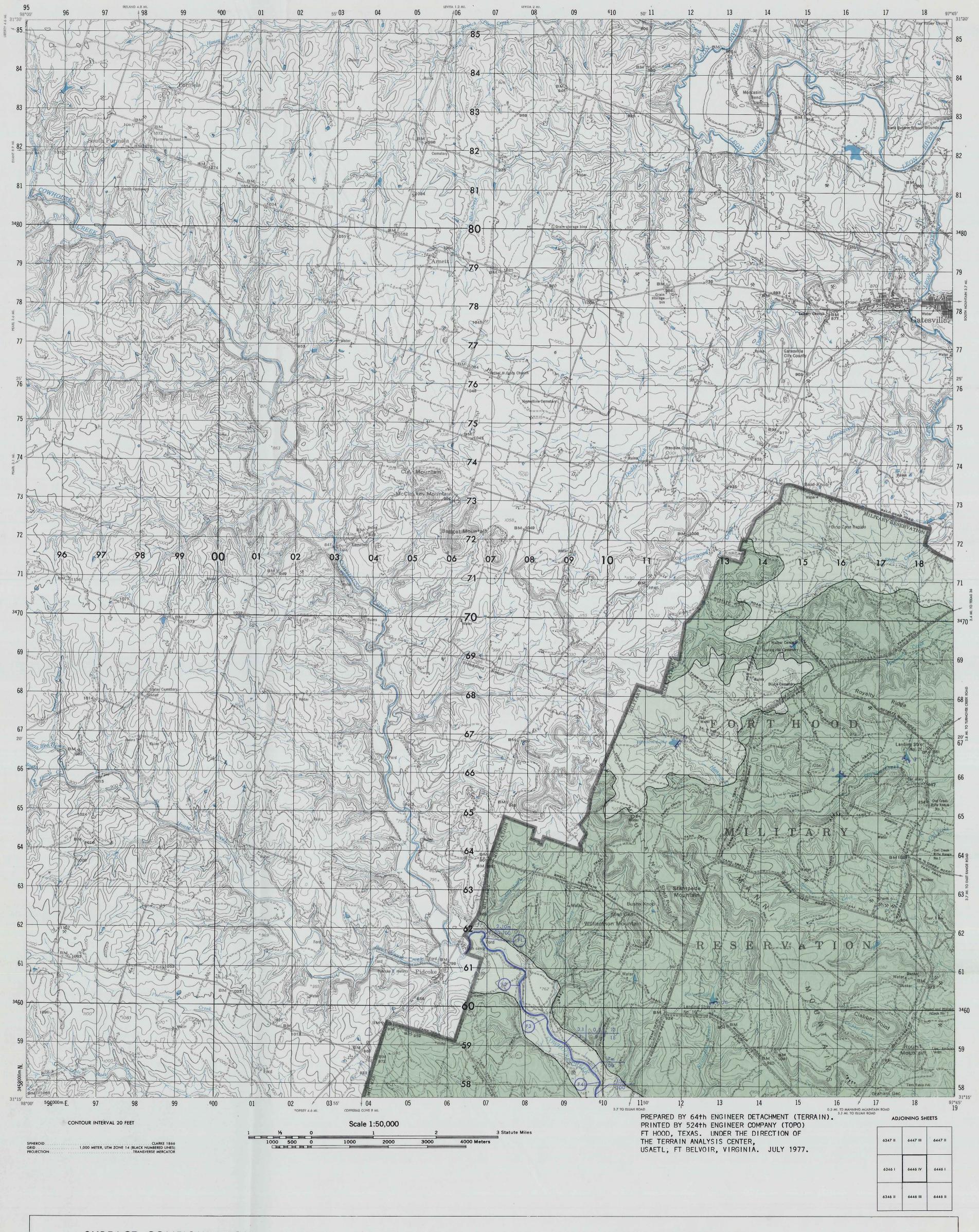
| | <u></u> | LEON R | IVER | COWHOUSE CK |
|------|--------------------------------|----------------------|-----------------|------------------|
| YEAR | DATE | @ GATESVILLE | @ BELTON | € PIDCOKE |
| 1962 | 10-10 10-17 | 22,620 - | - 2,016 | 19,767 - |
| 1963 | 3-10 10-15 12-20 | - - 1,499 | 1,764 - | 3,700 - + |
| 1964 | 6-16 9-22 | 4,317 | 3,418 - | 11,821 |
| 1965 | 5-16 6-5 | 15,187 - | - 4,045 | 41,214 - |
| 1966 | 11 -8 11 - 19 | 13 , 249 - | - 1,965 | 29 , 070 |
| 1967 | 4-11 7-20 | 1,118 | 1,015 - | - |
| 1968 | 1-21 5-10 | 4,498 - | 2,889 | - 9,173 |
| 1969 | 4-12 5-7 6-3 | 4,517 - | - - 2,385 | 4,987 - - |
| 1970 | 3-7 5-11 9-1 | 3,141 | 2,068 | - - 19,767 |
| 1971 | 7-25 7-27 10-1 | 5,933 - - | - - 659 | 6,912 - |
| 1972 | 10-19 10-21 10-22 | 4,317 - | - 1,913 | 7,752 - - |
| 1973 | 5-30 6-3 6-4 | - - 2,721 | 1,667 - - | - 6,091 - |
| 1974 | 9-17 10-16 | 2,837 | - 963 | 4,903 - |

FORDS

| MAD NO | GRID LOCATION | DEPTH | WIDTH | VELOCITY | BOTTOM | APPROACHES |
|--------|------------------------------|------------|------------|--------------|--------|------------|
| MAP NO | GRID LOOMITOR | <u> </u> | | | | |
| ţ | PK06956182 | 0.3m/lft | 3.lm/10ft | 0.9mps/3fps | GS | 50 ft |
| 2 | PK07866060 | 0.2m/0.8ft | 3.6m/12ft | 0.92mps/3fps | GS | 50 ft |
| 3 | PK08 5 559 7 5 | 0.3m/1ft | 7.6m/25ft | 0.92mps/3fps | GS | 50 ft |
| 4 | PK09955810 | 0.3m/lft | 5.5m/18ft | 0.92mps/3fps | GS | 50 ft |
| 5 | PK10715753 | 0.4m/1.5ft | 10.1m/35ft | 0.61mps/2fps | GS | 50 ft |



11



SURFACE CONFIGURATION SURFACE DRAINAGE Watercourse Width G Stream Gage Low Plains _____ 3-10 m 5 Dam (No. in text) Bottom Characteristics High Plains _____ 10-15 m F1 Ford (No. in text) R-rock C-clay 15-25 m Escarpments 4 m Bank Height low mean high Depth, > 25 m 5 Slope (%) low mean high Width,

1. SURFACE WATER

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Standard USGS gage data consisting of the average monthly flow of the streams on the Fort Hood Reservation are available. However, all gage stations are located off the Reservation.

The discharge data on the Leon River was obtained from the USGS gage stations located at Gatesville (8-1005) 3 miles northwest of the Reservation and at Belton Dam (8-1020) which is adjoining the Reservation on the west side. Discharge data on the Cowhouse Creek was obtained from the Pidcoke gage station (8-1010) which adjoins the Reservation on the west boundary.

Access to the water points is generally unrestricted. All points have a fairly firm bank condition except during extended periods of heavy rainfalls. The best sites for placement of equipment is on a bridge. All water should be treated before being used as a source of potable water.

Categories presented in this report are based on data that has been recorded and averaged over the past 25 years. The quantities and qualities should by considered correct except during periods of heavy rainfall.

| SOURCES | SOURCES QUANTITY . QUALITY | | DEVELOPMENT OF SOURCE | |
|--|--|--|---|--|
| The Leon River flows along the northern boundary of the Res- ervation in a meandering course. | Volume of water available is approximately 458,000 l/m (174.4 mgpd). This quantity greatly fluctuates, depending on the amount of rainfall received upstream. However, during the reported time frame the quantity only fell below 53,000 l/m (20 mgpd) only once. | The water in the Leon River is of good potable quality. The flowing chemical analysis is given: Dissolved Solids 281 mg/l Sulfate 37 mg/l Floride 0.4 mg/l Chloride 50 mg/l pH 6.9 Hardness 30 mg/l | Except in a few localized areas, access to the Leon River would be unrestricted. There would be a slight mud problem during periods of extended rainfall. | |
| The Cowhouse Creek meanders across the Reservation from the northwest boundary to the southeast bound-ary. | Volume of water available is approximately 159,381 l/m (60.63 mgpd). This quantity fluctuated greatly, depending on local rainfall. However, during the reported time frame the quantity only fell below 15,791 l/m (6.0 mgpd) only once. | The water in Cowhouse Creek is generally of good potable quality. However, during extended fording operations, the quality might decline slightly due to fuel and oil drippage and large amounts of suspended sediments. Dissolved Solids 350 mg/l Sulfate 31 mg/l Floride 1.2 mg/l Chloride 25 mg/l pH 8.0 Hardness 37 mg/l | The Cowhouse Creek is very acceptable for development. There are areas with rock outcrops that would provide an excellent work area even during extended periods of rainfall. | |

2. GROUND WATER

The primary water-bearing unit underlying the Fort Hood Reservation is the Travis Peak Formation, lowest unit of the Trinity Group of lower Cretaceous age with yields varying from 1143 liters per minute (Ipm) to 132 Ipm (302 gallons per minute (gpm) to 35 gpm). Two of the members, Hosston or 'lower sand unit' and Hensell or 'upper sand unit' are the principal aquifers and are seperated by argillaceous clays and shale. In the south to southwestern sector of the reservation the Travis Peak is represented by a calcareous facies, this increase in calcium carbonate cement decreases permeability and corresponsingly the coefficient of transmissibility from 109,296 lpd/m (8800 gpd/ft) to 497 lpd/m (40 gpd/ft) limiting yields and lessening quality. The approximate outline of this calcareous facies defines the extent of Map Unit 2.

Large diameter (3m/10ft), shallow (8m/25ft) wells in alluvium and the Walnut Clay Formation can be utilized for small yield 284 lpm (75 gpm), domestic and livestock use. Water level in these wells is dependent on normal rainfall with drastic declines during periods of drought.

The piezometric surface throughout the entire reservation area has been on the decline since 1900. Development of the groundwater resource for industrial, agricultural and public supply purposes have resulted in a decline particularly around Gatesville and Belton, Texas of 60 - 90 meters (200 - 300 ft).

MAP UNIT

QUANTITY AND SOURCE

DEPTH

QUALITY

DEVELOPMENT OF SOURCES

Small diameter wells, 15.2 - 25.4 cm (6-10 in) penetrate both the Hosston and Hensell Members of the Travis Peak Formation, yielding approximately 1135 liters per minute (1pm) or 300 gallons per minute (gpm) under existing con-

ditions. The Hensell varies from 9 - 27 m (30-90 ft) in thickness with a net thickness of permeable chert and quartz sand of 6 - 18 m (20-60 ft). The Hosston Member varies from 18 - 33 m (60 -100 ft) with a net thickness of siliceous permeable sand of 18 - 27 m (60-90 ft). See Table 2 for description of aquifers under the reservation area.

Yields from Travis Peak aquifers do not vary seasonally due to the artesian conditions but will vary with time from dewatering (loss of artesian pressure) with extended use. The specific capacity of wells on Fort Hood in this unit average 37.2 lpm per meter of drawdown (3.0 gpm/ft) varying between 29.8 - 70.7 ipm/m (2.4 - 5.7 gpm/ft) with a 1135 lpm (300 gpm) capacity pump. Wells occurring off the reservation in the same facies have specific capacities greater than 49.6 ipm/m (4.0 gpm/ ft). This demonstrates the ability of the aquifers to supply the water if pump capacities and well diameters are increased.

Deep wells in this unit range in depth from 210 - 240 meters (690 - 790 ft), with most seated in the Hosston Member of the Travis Peak Formation. The maximum depth needed to intersect the entire formation and derive the maximum yields varies from 365 meters (1200 ft) on the east to 182 meters (600 ft) on the extreme west boundary. The minimum depth, the top of the Travis Peak Formation, needed to reach moderate amounts of fresh water varies between 274 - 106 meters (900 -350 ft) going west. The average depths of producing sand layers near Gatesville, Texas are 152 - 167 meters (500 - 550 ft) and 190 -220 meters (625 - 720 ft).

Variation in water levels is directly related to the amount withdrawn from a well or well complex. There are seasonal fluctuations in the wells near Gatesville and Belton, Texas with declines due to large irrigation pumpage in the summer months and recovery during fall and winter. The 1967 depth of the water level in the reservation wells was at 100 meters (300 ft) below the surface.

Groundwater is fresh in quality and primarily used for domestic and public supply. The values of chloride (262 - 305 mg/l), sulfate (240 - 309 mg/I), and dissolved solids (1220 - 1350 mg/I) are within defined limits of freshness. See Table I for complete analysis. Chlorination is generally the only treatment exercised in public supplies.

Although fresh, the quality shows a definite decrease towards the south-southeast. An increase in shale reduces permeability which restricts the fresh water recharge and contamination by saline water in the Glen Rose Formation occurs locally from infiltration along fault planes and poorly constructed wells.

Tabular divides, small limestone-capped mesas and broad gently sloping lowlands don't impose any major restrictions to access or positioning of well sites and equipment. Seasonal flooding of stream and river plains should be a consideration for well locations and construction method. All deep wells are straight drilled with a 27.3 cm (10 3/4 in) casing set to the top of the first water-bearing unit and a 21.8 cm (8 5/8 in) casing to the base of the well. Cement is usually used to seal the well from surface contamination and various lengths of perforated screens are placed at each water-bearing unit. The diameter of wells vary from 40.6 - 20.3 cm (16 - 8 in) with the majority at 20.3 cm (8 in).

2

A decrease in yield 132 - 190 lpm (35-50 gpm) and quality (brackish) is attributed to an increase in the calcareous content of clastic and cementing materials in this facies of the Travis Peak Formation. The Sycamore Member, correlative to the Hosston Member is slightly coarser grained and is well cemented with calcium cabonate. The total thickness of the calcareous facies under the reservation varies from 45 - 60 meters (150-200 ft) with a sand thickness of less than 9 meters (30 ft) occuring in Killeen, Texas on the southern boundary.

The specific capacity for the Killeen well is 1.24 lpm/m (.1 gpm/ft) which should be representative of wells under the reservation. These aquifers support small domestic, public and livestock wells.

Well number I (AX-40-51-801) is drilled to a depth of 277 meters (910 ft) and the Killeen well to a depth of 235 meters (772 ft). Both of these wells intersect the Travis Peak, which has a maximum depth of 290 meters (950 ft), on the eastern limit and 182 meters (600 ft) to the west. The Hensell Member (calcareous) occurs at a minimum depth of 228 meters (750 ft) in the east and 122 meters (400 ft) in the west. Producing sands are at 167 - 173 meters (550-570 ft) and 213 - 217 meters (700-715 ft). Yields are small because of the low values of permeability, 10.7 Ipd/m^2 ($Igpd/ft^2$) and transmissivity, 497 ipd/m (40 gpd-ft). In order to maximize yields the entire formation needs to be penetrated and wells properly developed.

Hard, brackish quality groundwater is supplied from this unit, chloride (1010 mg/1) and dissolved solids (3480 mg/l) content are well over established limits for fresh water. A complete water analysis for Well #1 is found in Table 1. This water is used for domestic and public supply even though the major constituents exceed Public Health Service standards. Two major factors contribute to the brackish quality, calcareous cementation restricts recharge and reduces the flushing action needed to maintain freshness and contamination by

saline waters from poorly constructed wells.

Topography and urban development offer no major hinderance to drilling sites, though rapid growth of Killeen, the Highway System and surface water areas have covered much land. In an area of minimum yield adequate planning to include test drilling, pumping and chemical analyses of potential aquifers should be initiated to develop the most efficient well construction methods, pumping rates and spacing for long term maximum yields.

DEFINITIONS

ALLUVIUM - Sediments deposited by streams; includes floodplain deposits and stream-terrace deposits.

AQUIFER - A formation, group of formations or part of a formation that is water-bearing.

ARGILLACEOUS - Applied to all rocks or substances composed of clay, slate or shale.

ARTESIAN - Artesian water occurs where an aquifer is overlain by rock of lower permeability that confines the water under pressure greater than atmospheric.

CALCAREOUS - Composed essentially of lime and magnesium carbonates calcite (CaCO3) and dolomite $(CaMg(OO_3)_2)$.

COEFFICIENT OF TRANSMISSIBILITY - The number of liters of water that will move in one (1) day through a vertical strip of the aquifer one (1) meter wide extending the vertical thickness of the aquifer when the hydraulic gradient is one (I) meter per meter.

PERMEABILITY - The capacity for transmitting water under pressure.

PIEZOMETRIC SURFACE - An imaginary surface that everywhere coincides with the static level of the water in the aquifer. The surface to which the water from a given aquifer will rise under its full head.

SPECIFIC CAPACITY - The rate of yield of a well per unit of drawdown.

YIELD - The rate of discharge.

LIMITS ON QUALITY AND QUANTITIES

Freshwater -

Moderate

Small

(1) Maximum chlorides (2) Maximum sulfates (3) Maximum dissolved solids

600 mg/l400 mg/l 1500 mg/l

Brackish Water - (1) Dissolved solids Saline Water -

(I) Dissolved solids

Liter Per Minute (Ipm)

1500 - 15,000 mg/! 15,000 mg/l

Large

400 - 4,000 40 - 400

150,000 - 1,500,000 15,000 - 150,000

Gallons Per Day (gpd)

4 - 40

1,500 - 15,000

TABLE 1 CHEMICAL ANALYSIS OF WELL WATER in parts per million

| WELL NO. TWDB* NO. | 1 AX-40-51-801 | 2 HB-40-35-802 | 3 HB-40-35-803 | 4 HB-40-43-205 |
|---------------------------------|-------------------|-------------------|-------------------|-------------------|
| DATE SAMPLED | 1/29/43 | 9/9/55 | 7/10/52 | 9/9/55 |
| Silica (SiO ₂) | - | 14 | 14 | 13 |
| Iron (Fe) | - | .05 | .16 | .04 |
| Calcium (Ca) | 39** | 13 | 8.8 | 9.6 |
| Magnesium (Mg) | 27 | 7.2 | 5.5 | 5.5 |
| Sodium (Na) | 1206 | 483 | 465 | 444 |
| Potassium (K) | - | - | - | - |
| Bicarbonate (HCO ₃) | 507 | 445 | 450 | 436 |
| Carbonate | - | <u></u> | - | - |
| Sulfate (SO ₄) | - | 309 | 240 | 265 |
| Chloride (Ct) | 1010 | 295 | 305 | 262 |
| Fluoride | - | 3 | 2 | 2 |
| Nitrate (NO ₃) | 0.5 | 4 | .0 | 3.5 |
| Dissolved solids | 3480 | 1350 | 1260 | 1220 |
| Hardness | 208 | 62 | 44 | 46 |
| рН | - | 7.6 | 8.5 | 7.6 |
| | | | | |

TABLE 2 GENERALIZED DESCRIPTION AND WATER-BEARING PROPERTIES OF GEOLOGIC UNITS OF FORT HOOD
(Adapted from Klemt, Perkins and Alvarez 1975)

| SYSTEM | SERIES | STRATIGRAPHIC UNITS | THICKNESS m/ft | LITHOLOGY | WATER-BEARING PROPERTIES |
|----------------------------|-------------------------------------|---|--------------------|---|--|
| Quaternary and Tertiary | Recent, Pleistocene and Pliocene | River terrace, flood plains, alluvial deposits. | 0-6/0-18 | Silt, clay, sand and gravel. | Small amounts of fresh water. |
| | | Edwards Formation | 0-24.3/0-80 | Hard, fossiliferous limestone, shell fragments and rudistid reefs calcareous shale and marl, chert, flint, dolomite. | Small amounts of fresh water in honeycombed limestone. |
| | | Comanche Peak Formation | 0-30.4/0-100 | Limestone and limy shale. | Yields little or no water. |
| | | Walnut Formation | 0-30.4/0-100 | Shale and calcareous clay. | Yields little or no water. |
| | | Paluxy Formation | 0-6.1/0-20 | Fine to medium grained, compact friable quartz sand with interbedded clay and shale. | Yields small amounts of fresh water. |
| Cretaceous | Comanche | Glen Rose Formation | 91.4-167.6/3-0-500 | Dense to chalky limestone, sandstone, shale, and anhydrite. | Yields small amounts of brackish water. |
| | | | | Upper Unit: Poor to well sorted, fine to coarse grained sands and sandstone, sandy clay, shale and arenaceous limestone. | Yields small to large amounts of water. |
| | | Travis Peak Formation | 95.7-60.9/150-200 | Middle Unit: Clay and shale with interbedded sand, limestone and shale beds. | Yield little or no water. |
| | | | | Lower Unit: Poorly sorted, pebbly conglomerate, poor to well sorted fine to coarse grained sand and sandstone, silty clay, shale and limestone streaks. | Yields moderate to large amounts of water. |

^{*} Texas Water Development Board

** For practical purposes, parts per million and milligrams per liter
may be considered equivalent.

2. GROUND WATER (Continued)

WELL NO. I

Shale

LOGS OF SELECTED WELLS AT FORT HOOD

Four well logs from Fort Hood are given. These were chosen as being representative from among the eleven available. They are identified in the table both by a Map Number and a Well Number, with only the Map Numbers being shown on the maps. The descriptions and Well Numbers are as published in the Texas Water Development Board Report #195, vol. 2, with metric equivalents added.

Lime

40-205

12.2-62.5

| WELL NO. I | | | Lime | 12.2-62.5 | 40-205 |
|---|-------------------------------|---|---|----------------------------|---|
| Location: I.O mi NE of Fort H | lood cantonment area. along | Bell County | Gray shale and shells | 6.1-68.6 | 20-225 |
| East Range Road. F | - | TWDB Well No. AX-40-51-801 Elevation: 875 ft | Broken lime | 13.7-82.3 | 45-270 |
| Owner: Ed Huess Driller: Ralph Roberts | | | White lime | 13.7-96.1 | 45-315 |
| Drilled: 1943 | | | Gray shale | 12.2~108.3 | 40-355 |
| | Thickness and Depth | Thickness and Depth | Broken Time | 3.1-111.3 | |
| | (m) | (ft) | Lime | 12.2-123.5 | 10-365 40-405 |
| Yellow clay | 5,5-5.5 | 18-18 | Shate | 3.1-126.6 | |
| Hard rock and yellow clay | 3.1-8.5 | 10-28 | Gray shale and | 3.1-120.0 | 10-415 |
| Hard white lime | 11.3-19.8 | 37-65 | shells | 12.2-138.8 | 40-455 |
| Slate | 19.8-39.7 | 65-130 | Gray shale (top of | 0.5.147.7 | 00.407 |
| Blue shale | 13.7-53.4 | 45-175 | first Trinity sand) Soft water sand | 8.5-147.3 | 28-483 |
| Lime | 1.8-55.2 | 6-181 | (bottom of first | 47 4 44 7 | |
| Blue shale | 8.8-64.I | 29-210 | Trinity sand) | 17.4-164.7 | 57-540 |
| Lime, shells and slate | 12.2-76.3 | 40-250 | Red bed | 13.7-178.4 | 45-585 |
| Blue slate | 12.2-88.5 | 40-290 | Red bed | 18.3-197.7 | 60-645 |
| | 9.2-97.6 | 30-320 | Water sand | 5.2-201.9 | 17-662 |
| Gray state | 9.2-106.8 | 30-350 | Hard broken lime | 1.5-203.4 | 5-667 |
| Gray slate | 1.5-108.3 | 5-355 | Gravel and sand (bottom second | | |
| Shale | | 5-360 | Trinity sand) | 3.9-207.4 | 13-680 |
| Water sand, little water | 1.5-109.8 3.1-112.9 | 10-370 | Red bed | 3.1-210-5 | 10-690 |
| Shale | | | | | |
| Lime | 4.6-117.4 | 15-385 | | | |
| Shale | 4.6-122.0 | 15-400 | WELL NO. 3 | | |
| Lime, shale | 7.6-129.6 | 25-425 | Location: 5.3 mi SE of Gatesvi | | Coryell County |
| Sand, lime shale | 7.6-137.3 | 25-450 | 0.3 mi NE of 36. PK | area. Approximately 239727 | TWDB Well No. HB-40-35-803 Elevation: 740 ft |
| Sandy lime | 15.3-152.5 | 50-500 | Owner: U.S. Army | | |
| Lime, shale | 6.1-158.6 | 20-520 | Driller: Layne Texas Co. Drilled: 1943 | | |
| Sandy lime, shale | 4.6-163.2 | 15-535 | | Thickness | Thickness |
| Shale | 16.8-180.0 | 55-590 | | and Depth (m) | and Depth (ft) |
| Sandy shale | 16.8-196.7 | 55 - 6 45 | Surface soil | 0.3-0.3 | 1-1 |
| Blue shale | 4.6-201.3 | 15-660 | Red clay | 2.1-2.4 | 7-8 |
| Sandy shale | 7.6-208.9 | 25-685 | Sand and grave! | 5.2-7.6 | 17-25 |
| Brown sand | 6.1-215.0 | 20-705 | Sand and gravel | 7.6-15.3 | 25-50 |
| Blue shale | 7.6-222.7 | 25-730 | Lime shale | 19.8-35.1 | 65-115 |
| Lime | 11.6-234.0 | 38-768 | Lime and shale | 12.2-47.3 | 40-155 |
| Blue shale | 1.8-236.1 | 6-774 | Lime and shale | 32.0-79.3 | 105-260 |
| Sand, water | 0.9-237.0 | 3-777 | Lime and shale | 15.3-94.6 | 50~310 |
| Grave! | 0.3-237.3 | I-778 | Lime and shale | 12.2-106.8 | 40-350 |
| Lime and sand | 4.3-241.6 | 14-792 | Lime and shate | 16.8-123.5 | 55-405 |
| Lime | 5.5-247.1 | 18-810 | Lime and shale | 12.2-135.7 | 40-445 |
| Blue shale | 1.5-248.6 | 5-815 | Lime and shale | 12.2-147.9 | 40-485 |
| Red beds | 1.8-250.4 | 6-821 | Sand and shale | 2.7-150.7 | 9 -494 |
| Lime | 3.1-253.5 | 10-831 | Sandy shale (top | | |
| Blue shale | 3.5-256.8 | 11-842 | first Trinity sand) | 0.6-151.3 | 2-496 |
| Blue shale | 8.5-265.4 | 28-870 | Sand | 1.5-152.8 | 5-501 |
| Brown shale | 3.1-268.4 | 10-880 | Sand | 1.8-154.6 | 6-507 |
| Blue shale | 3.1-271.5 | 10-890 | Sand (bottom first Trinity sand) | 3.1-157.7 | 10-517 |
| Red beds | 3.1-274.5 | 10-900 | Sandy shale | 3.9-161.7 | 13-538 |
| Sand and slate | 3.1-277.6 | 10-910 | Red bed | 1.5-163.2 | 5-535 |
| | | | Red bed | 6.1-169.3 | 20-555 |
| | | | Red rock and shale | 6.1-175.4 | 20-575 |
| WELL NO. 2 | | | Red rock and shale | 6.7-182.1 | 22-597 |
| location: 5.5 mi CC -4.001 | dila an TV 70 - 10 11 | Comments Comments | Red rock and shale | 3.9-186.1 | 13-610 |
| Location: 5.5 mi SE of Gatesy Fort Hood cantonmen | nt area. Approximately | Coryell County TWDB Well NO. HB-40-35-802 | Red rock and shale | 7.6~193.7 | 25-635 |
| 0.5 mi NE of TX 36. | MR 243/21 | Elevation: 730 ft | Sand, shale (top | | · · · · - |
| Owner: U.S. Army Driller: Layne Texas Co. Drilled: 1943 | | | second Trinity sand) | 9.2-202.8 | 30-665 |
| | Thickness and Depth (m) | Thickness and Depth (ft) | Sand (bottom second Trinity sand) | 13.7-216.6 | 45-710 |
| Surface soil | | | Dark shale | 3.4-219.9 | 11-721 |
| Gravel and water | 4.6-4.6 | 15-15 | | | |
| sand | 3.7-8.2 | 12-27 | | | |
| Lime | 0.9-8.2 | 3-30 | | | |
| Sand (dry) | 7.6-16.8 | 25-55 | | | |
| Broken lime and | 10 0 77 - | | | | |
| shale | 12.2-29.0 | 40-95 | | | |
| White lime | 10.7-39.7 | 35-130 | | | |
| Shale | 10 7 50 7 | 75 165 | | | |

35-165

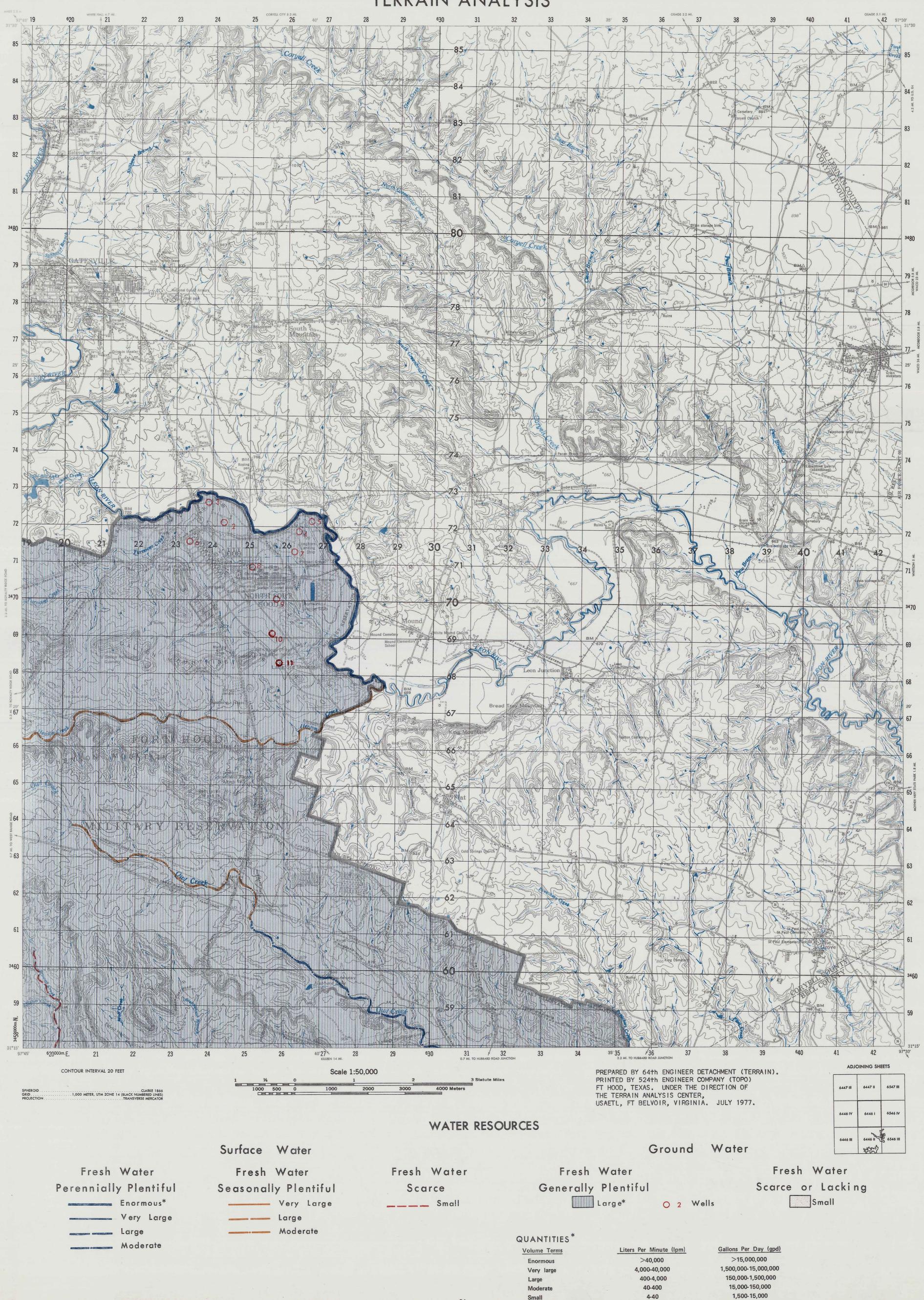
10.7-50.3

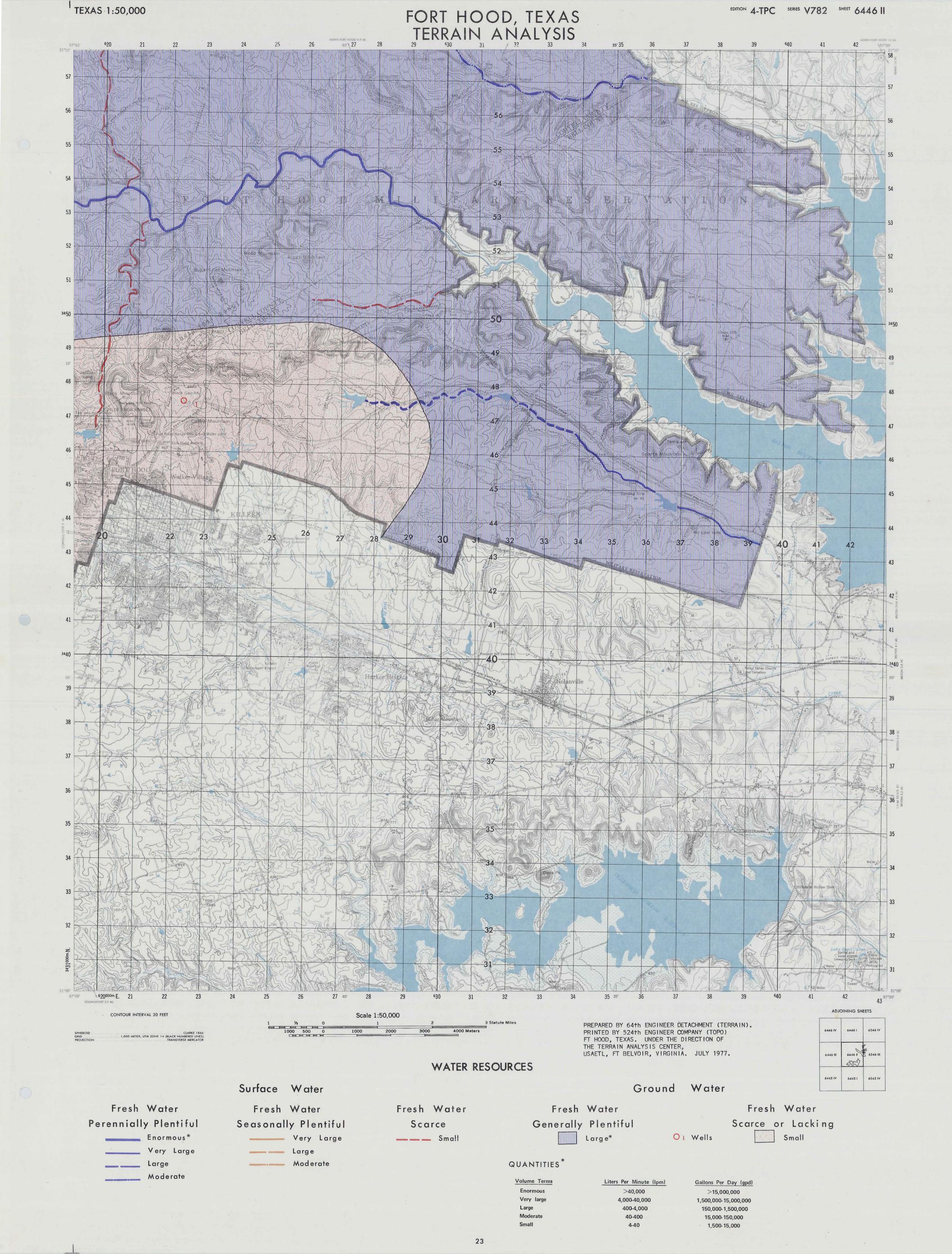
| WELL NO. 4 | | | | | |
|--|------------------------|--|--|--------------|---------|
| Location: 6 mi SE of Gatesvil Fort Hood cantonmen | t area. Approximately | Coryell County TWDB Well No. HB-40-43-205 | Sand | 2.44-160.02 | 8-525 |
| 1.2 mi NE of TX 36. | PK 263719 | Elevation: 728 ft | Broken sand | 1.52-161.54 | 5-530 |
| Owner: U.S. Army Driller: Layne-Texas Co. | | | Sand | .91-162.46 | 3-533 |
| Drilled: 1943 | | | Lime | 1.22-163.68 | 4-537 |
| | Thickness and Depth | Thickness and Depth | Red rock and lime | 40.54-204.22 | 133-670 |
| | (m) | (ft) | Broken sand | .61-204.83 | 2-672 |
| Sandy soil | .61-1 | 2-2 | Sandy shale (top of second Trinity sand) | 01 205 74 | 7 475 |
| Sandy clay | 1.52-2.13 | 5-7 | • | .91-205.74 | 3-675 |
| Quicksand | 7.01-9.14 | 23-30 | Sand | 16.76-222.5 | 55-730 |
| Blue rock | 3.04-12.19 | 10-40 | Shale (break in sand) | 1.52-224.03 | 5-735 |
| Lime and shale | 140.2-152.4 | 460-500 | Coarse sand | 3.05-227.08 | 10-745 |
| Shell | 3.04-155.45 | 10-510 | Sandy shale | 1.52-228.6 | 5-750 |
| Lime and shale (top | | - | Dark shale | 1.52-230.12 | 5-755 |
| of first Trinity sand) | 2.13~157.58 | 7-517 | | | |

WELL DATA FOR FORT HOOD

| MAP NO. | LOCATION | WELL NO. | DATE. COMPLETED | WELL DIAM. cm/in | WELL DEPTH m/f† | CAS ING DEPTH | AOUIFER PIERCED m/ft | WATER LEVEL +,- SURFACE m/f+ | DATE MEASURED | LAND SURFACE ELEV m/ft | YIELD Ipm/gpm | REMARKS |
|---------|--|-------------------------|--------------------|------------------------|-----------------------|------------------|----------------------------|---------------------------------------|------------------|---------------------------------|------------------|-----------------------|
| i | <pre>i.6 Km (l.0 mi) NE of Fort Hood can- tonment area, along East Range Road. PK 223475</pre> | AX-40-51-801* | 1943 | - | 277. 3/910 | - | - | -84.1/-276 | Jan 12, 1943 | 298.7/980 | - | Abandoned and plugged |
| 2 | 8.85 Km (5.5 mi) SE of Gatesville on TX 36, on North Fort Hood canton- ment area. App- roximately 0.8 Km (0.5 mi) NE of TX 36. PK 243721 | HB-40-35-802 | 1943 | 20.3/8 | 210.3/690 | 210.3/690 | 145.6/478 | -19.2/-63 | Jan 14, 1943 | 222.5/730 | 1135.6/300 | Public water supply |
| 3 | 8.48 Km (5.3 mi) SE of Gatesville on TX 36, on North Fort Hood cantonment area Approximately .48 Km (0.3 mi) NE of TX 36. PK 239727 | • | 1943 | 20.3/8 | 219.7/721 | 219.7/721 | 149.9/492 | -55.7/-183 | Oct 1946 | 222.5/740 | 1135.6/300 | Public water supply |
| 4 | 8.68 Km (5.4 mi) SE of Gatesville on TX 36, on North Fort Hood cantonment area. Approximately .48 Km (0.3 mi) SW of TX 36. PK 263719 | | 1943 | 20.3/8 | 230.1/755 | 230.1/755 | 157.8/518 | -37.4/-123 | June 1943 | 219.4/720 | 1135.6/300 | Public water supply |
| 5 | 10.46 Km (6.5 mi) SE of Gatesville on TX 36, on NOrth Fort Hood cantonment area. Approximately 2.74 Km (1.7 mi) NE of TX 36. PK 267722 | HB-40-35-801 | 1943 | 20.3/8 | 230.1/755 | 230.1/755 | 157.2/516 | -45.4/-149 | June 1943 | 222.8/731 | 1135.6/300 | Public water supply |
| 6 | 8.85 Km (5.5 mi) SE of Gatesville on TX 36, on North Fort Hood cantonment area. Approximately 0.8 Km (0.5 mi) SW of TX 36. PK 234716 | | 1942 | 20.3/8 | 233.1/765 | 231.6/760 | 153.9/505 | -29.5/-97 | Sept 1946 | 233.1/765 | 1135.6/300 | Public water supply |
| 7 | 10.78 Km (6.7 mi) SE of Gatesville on TX 36, on North Fort Hood cantonment area. Approximately 1.6 Km (1 mi) NE of TX 36. Pk 262713 | HB-40 -4 3-204 | 1943 | 20.3/8 | 231/758 | 231/758 | 162.4/533 | -57.9/-190 | May 1943 | 224.9/738 | 757/200 | Public water supply |
| | II.26 Km (7 mi) SE of Gatesville on TX 36 on North Fort Hood cantonment area 0.48 Km (0.3 mi) NE of TX 36. PK 251709 | HB-40-43-206 | 1942 | 20.3/8 | 224/735 | 222.8/731 | 151.1/496 | -33.2/-109 | March 1943 | 228.6/750 | 1135.6/300 | Public water supply |
| | 12.39 Km (7.7 mi) SE of Gatesville on EX 36, on North Fort Hood cantonment area 0.48 Km (0.3 mi) NE of TX 36. PK 257701 | HB-40-43-207 | 1943 | 20.3/8 | 227/745 | 227/745 | 157.5/517 | -26.2/-86 | Feb 26, 1943 | 221.6/727 | 1135.6/300 | Public water supply |
| | 12.87 Km (8 mi) SE of Gatesville on TX 36, near North Fort Hood cantonment area, 0.32 Km (0.2 mi) SW of TX 36. PK 256691 | HB-40-43-202 | 1943 | 20.3/8 | 235.3/772 | 235/771 | 161.8/531 | -45.7/-150 | Feb 2, 1943 | 238.3/782 | 1135.6/782 | Not in use |
| | 13.68 Km (8.5 mi) SE of Gatesville on TX 36, near North Fort Hood canton- ment area, 0.64 Km (0.4 mi) SW of TX 36. PK 258683 | 1 B40-43-203 | 1943 | 20.3/8 | 242.3/795 | 238.3/782 | 174.3/572 | -45.7/-150 | Feb 22, 1943 | 237.7/780 | 1135.6/300 | Not in use |

^{*} Texas Water Development Board





Small

1,500-15,000

4-40

D. ENGINEERING SOILS

The intent of this section is to provide the military engineer or planner with preliminary information on the distribution and description of the major soil groups in the Fort Hood area. The soil map and engineering properties table provide the location and relative estimates of several properties and uses of each soil map unit. The major categories are based on grain size distribution and depth to bedrock. Normally the investigation used only information on a depth up to two (2) meters, but on floodplains, data from wells were averaged to indicate a representive maximum depth.

The soils of the Fort Hood study area have been broken down into six (6) engineering units, variants of fine-grained and coarse and fine-grained soil. Each engineering soil unit mapped and discussed in this report is an association of several soil series. Deep soils are found on floodplains and major stream beds and are subject to flooding. Shallow soils present problems concerning trafficability. Areas of erosion and washout expose the bedrock to direct weathering causing rutting and steep slope development, this inhibits easy movement and denial of certain avenues of approach. The fine-grained, moderately deep, silty clay unit, Map Unit 2 occurs most frequently in the study area and is closely associated with the fine-grained, shallow, clay loam, Map Unit 1.

Information pertaining to permeability and shrink-swell potential is important in planning drainage, housing and waste disposal for stationing troops. Trafficability across the area and potential flood zones are important in all military operations.

Data for this study was compiled from prior soil surveys and aerial photography and were supplemented by a conversation with personnel of the Soil Conservation Service at Temple, Texas. Delineations were modified based on topography, bedrock geology and field reconnaissance. The accompanying map is adequate for general planning but detailed soil exploration and testing would be needed for specific sites and projects.

| MAP UNIT | MAJOR SOIL SERIES | LANDFORM AND SLOPE | TYPICAL SO | DESCRIPTION | WATER TABLE DEPTH m (f†) | PERMEABILITY cm/hr (in/hr) | SHRINK-SWELL POTENTIAL | | SEPTIC TANK FILTER FIELD | FOUNDATIONS FOR SMALL BUILDINGS | ROAD LOCATION | SHALLOW EXCAVATIONS | TRAFFICABILITY | REMARKS |
|----------|-------------------------------------|--|-----------------------------------|--|---------------------------------|---|---------------------------|-------------------------|-----------------------------|------------------------------------|---------------------------------|-------------------------|--------------------|--|
| 1 | Trinity Houston Black Frio | Floodpiain, gentle, 0 - 8 percent slopes. | 15 (5.9) CH 100 (39.4) CL CL-ML | Very dark gray to black clay. Dark gray to gray silty clay Grayish brown silty clay. | 0 - 1 (0-3.28) Nov Feb. | Very slow to moderately slow 0.15 - 1.5 (0.06 - 0.6) | Moderate to very high. | Severe; w,f | Severe; w,f | Severe; w,x | Severe; x | Severe; w,f,c | Severe; w,f | Seasonal flooding, crack development. |
| 2 | Denton San Saba Krum | Levet to sloping uplands; I - 8 percent stope. | 70 (27.5) CH, CL 100 (39.4) MH | Dark grayish brown silty clay. Brown silty clay. | >2 (6.56) | Very slow to moderately slow 0.15 - 1.5 (0.06 - 0.6) | High | Severe; d | Severe; d | Severe; × | Severe; × | Severe; c | Severe; × | Cracks develope when soil is dry, this increases permeability and affects horizon development. |
| 3 | Speck Purves | Rolling to hillocky uplands; 5 - 15 percent slope. | 32 (12.5) CH 60 (23.5) CH,SC | Dark grayish brown clay. Reddish brown plastic clay with clayey sand lenses. | > 2 (6.56) | Moderately slow 0.5 - 1.5 (0.2 - 0.6) | Moderate to high. | Se vere ; s,d | Slight to severe; s | Moderate to severe; s | Moderate to severe; fts,s | Moderate to severe; d,s | Slight; fts | Rutting into bedrock. |
| 4 | | Floodplain and Terrace Deposits, gentle, 1 - 3 percent slopes. | 16 (6.2) CH 100 (39.4) SC-SM SM | Very dark gray to black clay. Gray silty sand. Brownish silty sand. | 0 - 1 (0 - 3.28) Nov Feb. | Moderate 1.5 - 5.0 (0.6 - 2.0) | Low | Severe; w,f | Severe; w,f | Slight to moderate; w,f | Moderate; fts | Severe; w,f | Moderate; w,f | Seasonal flooding. |
| 5 | | Dissected uplands; 5 - 15 percent slope. | 20 (7.8) GC,CH SC,CH | Grayish brown clayey gravel. Brown clayey sand. | >2 (6.56) | Moderately slow 0.5 - 1.5 (0.2 - 0.6) | Low | Severe; d | Severe; d | Severe; d | Moderate; d,l | Moderate; d | Moderate; d,s,t | |
| 6 | Tarrant Brackett | Convex to plane slopes on ridgetops and up- lands; I - 50 percent slopes. | 30 (11.8) GC,CH | Dark brown to light brownish gray clayey cobble. | > 2 (6.56) | Moderately slow 0.5 - 1.5 (0.2 - 0.6) | Low | Severe; d | Severe; d,s | Severe; d | Moderate; d,l | Severe; d | Moderate; s | Rutting into bedrock. |

- Soils that have similar profiles make up a soil series. The series is the common name
 of the soil and derives its name from a town or geographic feature near where it was
 first observed and mapped. Many other minor soils are included in the map unit.
- 2. The Unified Soil Classification System, Technical memorandum No. 3-357, US Army Corps of Engineers, March 1953.

SOIL RELATED PROPERTIES AFFECTING LIMITATIONS

- w wetness
- f flooding d - depth to bedrock
- s slope
- x high shrink-sweil
- c too clayey
 1 large stones
- fts traffic supporting capacity

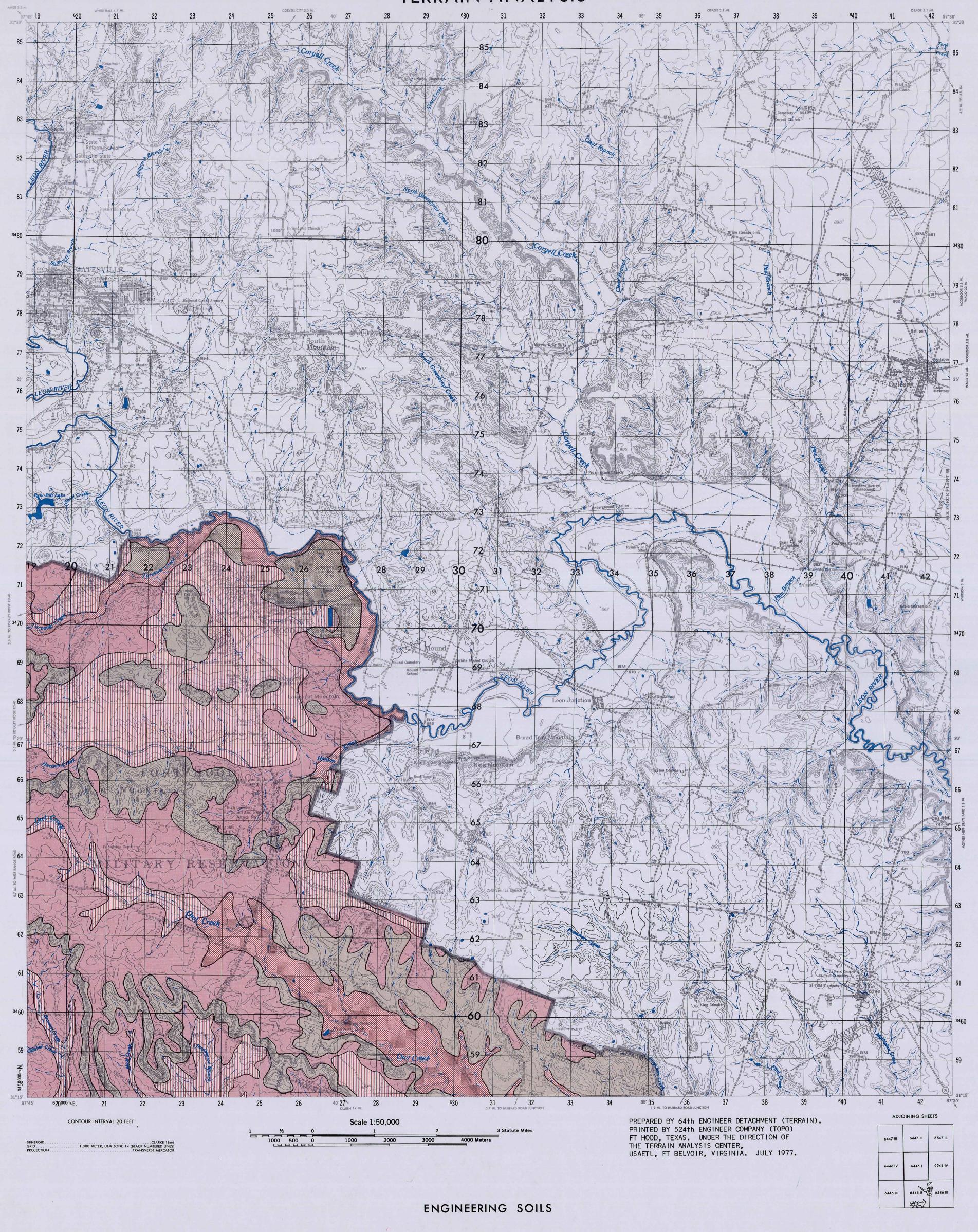
DEFINITION OF RATING TERMS

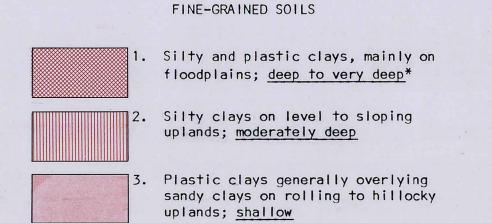
Slight - relatively free of limitations or limitations are easily overcome.

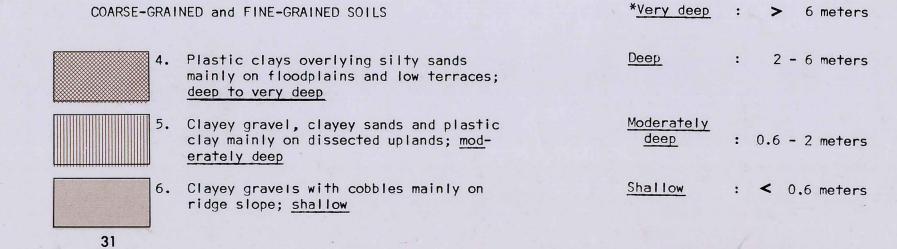
Moderate - limitations can be overcome with good planning and/or careful design.

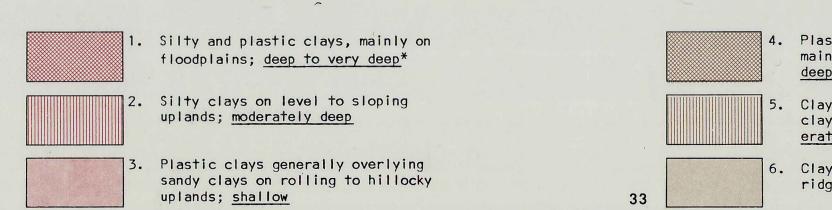
Severe - limitations are serious and are difficult to overcome.

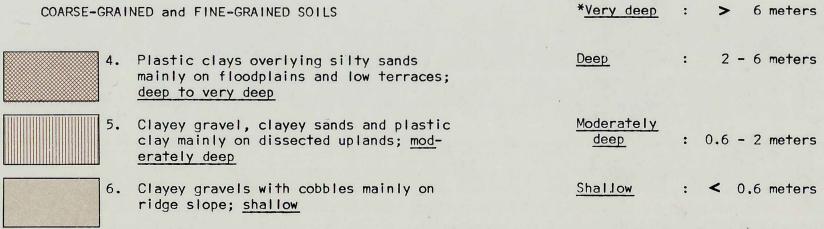
FORT HOOD, TEXAS TERRAIN ANALYSIS



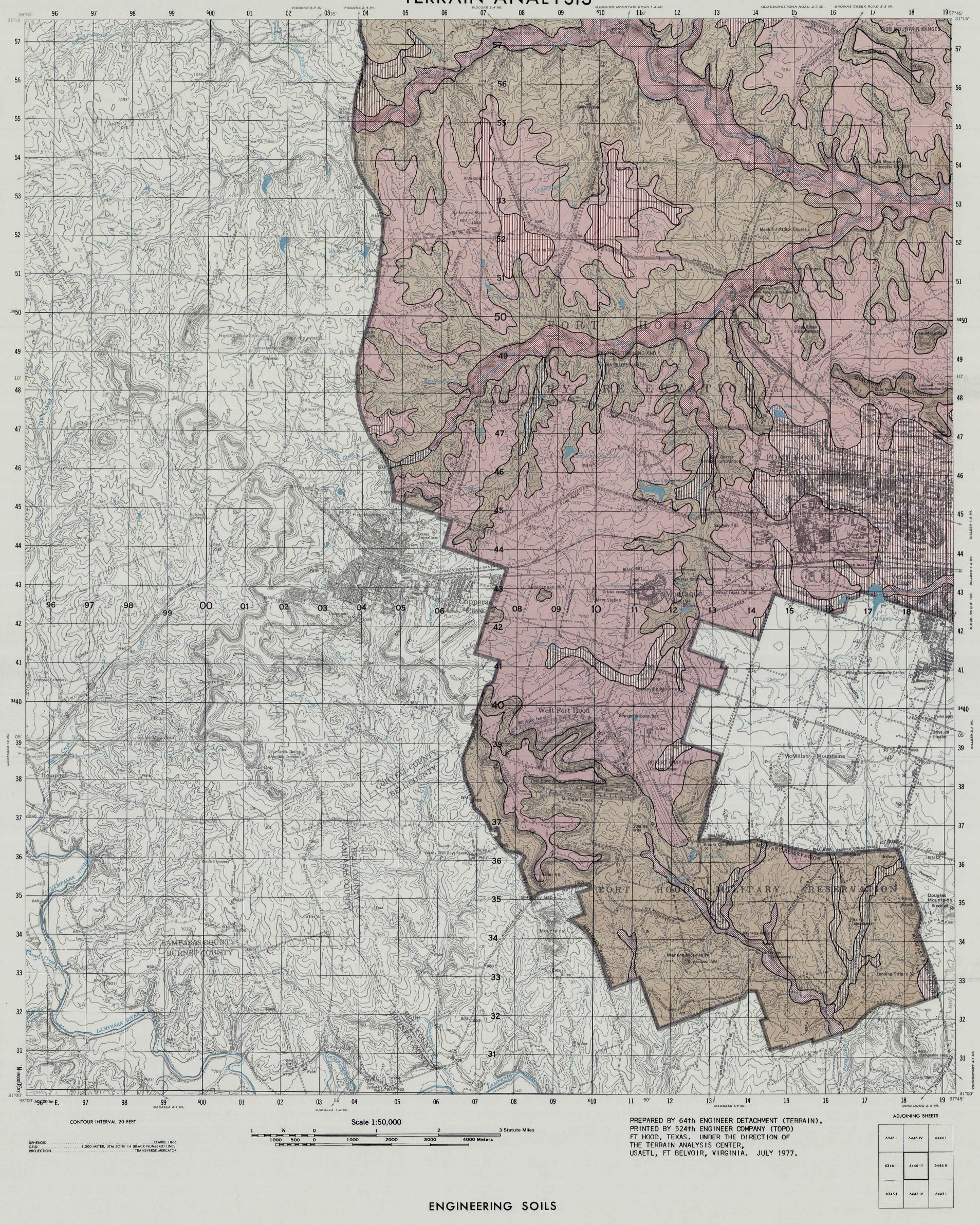








EDITION 4-TPC SERIES V782 SHEET 6446 II





1. Silty and plastic clays, mainly on



Silty clays on level to sloping uplands; <u>moderately deep</u>

floodplains; deep to very deep*

FINE-GRAINED SOILS

Plastic clays generally overlying sandy clays on rolling to hillocky uplands; <u>shallow</u>

COARSE-GRAINED and FINE-GRAINED SOILS

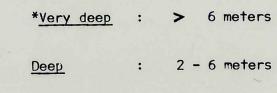


Plastic clays overlying silty sands mainly on floodplains and low terraces; deep to very deep



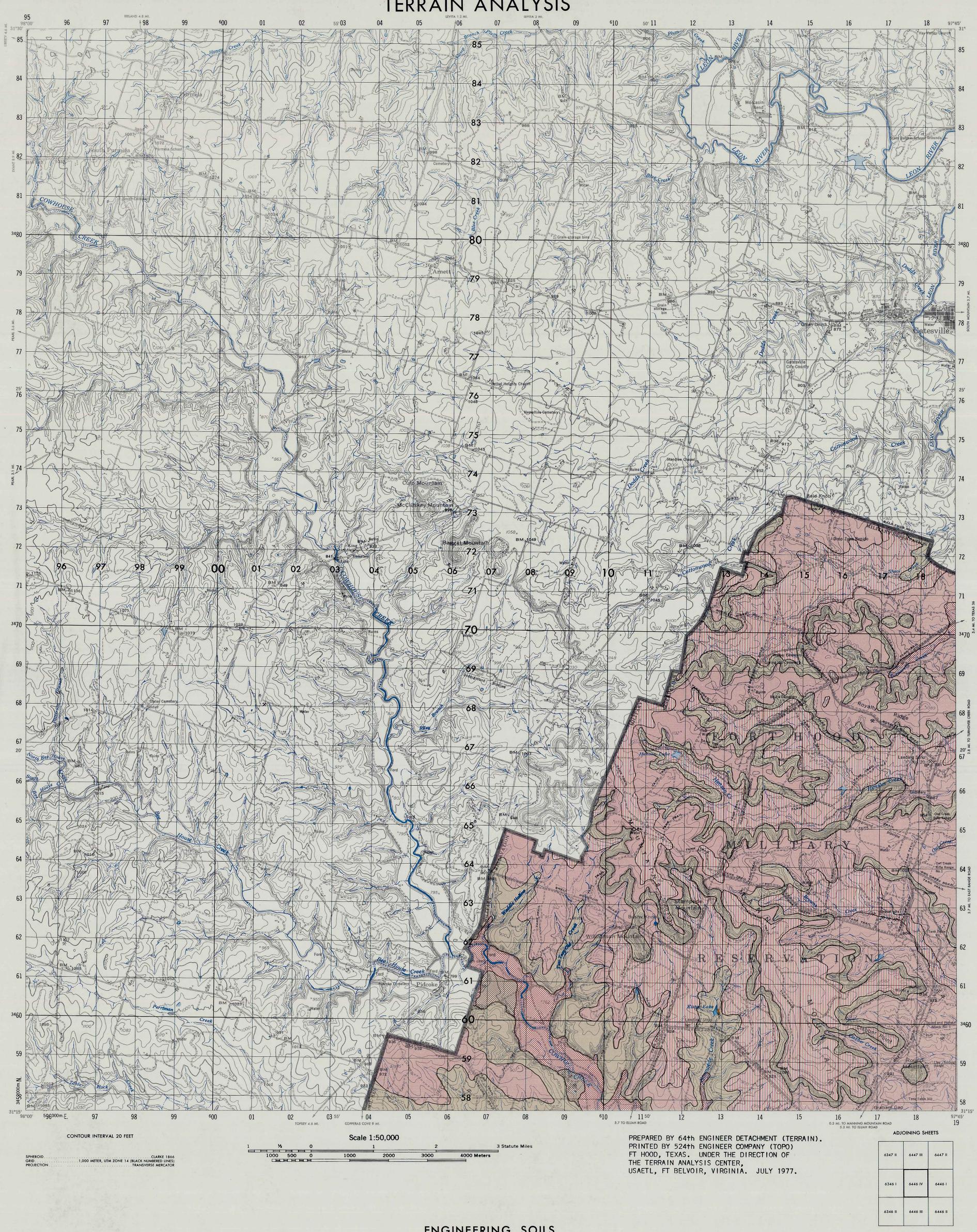
35

 Clayey gravel, clayey sands and plastic clay mainly on dissected uplands; moderately deep 6. Clayey gravels with cobbles mainly on ridge slope; shallow

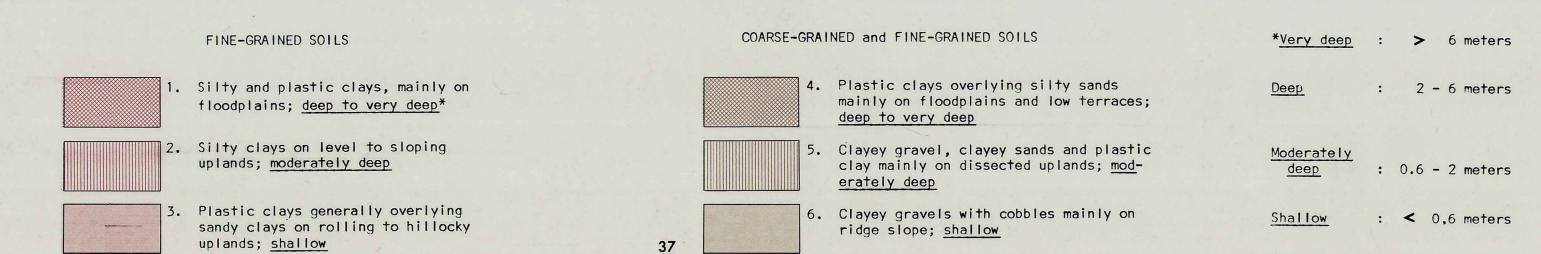


Moderately deep : 0.6 - 2 meters

Shallow : < 0,6 meters



ENGINEERING SOILS



E. ENGINEERING GEOLOGY

Several rock formations are near the surface in the Fort Hood area. These are categorized into six (6) distinct map units based on engineering characteristics related to the lithology.

All the consolidated formations are of lower Cretaceous age and belong to the Comanche Series. The most extensive area exposed is the oldest unit in the Fredericksburg Group — the Walnut Clay, a limestone, shale and clay formation occurring as rolling plains. Stratigraphically below this, occuping terrace slopes are the upper units of the Trinity Group — the Paluxy Sand and the Glen Rose, a limestone, marl and sand formation. The mesa-like hillocks and topographic highs are composed of upper units from the Fredericksburg Group — the Comanche Peak, a limestone and shale formation; the Edwards Limestone and the Kiamichi Clay. The floodplains are filled with silt, clay and some sand and gravel deposits.

All the formations are essentially flat-lying and are overlain by a soil cover ranging in thickness from 0.6 meters (2 ft) to 4.0 meters (12 ft).

Because of the generalization involved in fitting a formation into a category, precise engineering qualities are averaged necessitating detailed site investigation whenever specific information is required for planning.

Considerable geologic and engineering information was provided from a study conducted by the Bureau of Economic Geology, The University of Texas at Austin, Texas. Further inquiries should be directed to that address.

| MAP UNIT | TOPOGRAPHY | ROCK DESCRIPTION | PHYSICAL CONSTANTS | ENGINEERING EVALUATION | EXCAVATION FACTORS | PITS AND QUARRIES |
|---|---|--|--|--|---|---|
| 1. DENSE HARD MASSIVE LIMESTONE | Predominantly resistant caprock on mesa-like hillocks; surfaces of many topographic highs and ridges. | Light gray, crystalline, coarse grained organic nearly pure limestone; much calcareous shell detritus and abundant chert nodules. | Low to high permeability; low corrosion potential; high solubility; low plasticity; high seismic transmission velocity, possibly fracture controlled. | High foundation strength; suitable for hydrated lime, aggregate, raw material for portland cement, base material, riprap, ballast, chemical and industrial process stone, agricultural limestone, fluxstone, and building stone. | Residual overburden is stony clay less than 0.5 meters deep; excavation easy; high slope stability. | Many potential quarry sites with access to existing lines of communication. |
| 2. SANDY HARD BEDDED LIMESTONE | Bench form and scarps. | Limestone, clay, marl, sand; limestone fine grained, arenac- eous, chalky to hard, with mar- ine megafossils; interbedded with units composed of variable amounts of clay, marl, and sand; laminated dark gray. | Low to moderate permeability; low to moderate corrosion potential; high solubility; low to moderate plasticity; variable seismic transmission velocity. | Moderate to high foundation strength; suitable for aggregate locally. | Residual overburden is stony clay less than 0.5 meters deep; excavation easy to difficult; moderate to high slope stability. | Many good quarry sites. |
| 3. LOOSELY CEMENTED FINE-GRAINED SAND | Local scarps and slightly rolling plains. | Quartz sand, fine to very fine grained, friable, in part calcite cemented and hard; some thin interbeds of gray shale and limestone; pyrite nodules and concretions; coal smuts locally; commonly cross beded and/or laminated; silty limestone beds, light gray to red. | High permeability; low to moderate corrosion potential; low to moderate solubility; low plasticity; low to moderate seismic velocity. | High foundation strength; suitable for sand and gravel. | Residual overburden is sandy clay less than 0.5 meters deep; easily excavated; mod- erate to high slope stability. | Few good quarry sites because of scarps. |
| 4. SOFT TO HARD CHALKY LIMESTONE | Gentle to moderatly steep slopes. | Medium grained, chalky, some interbeds of calcareous shale, thin-bedded to massive, distinctly bedded to wavy bedded and nodular, light gray to white. | Moderate permeability; low corrosion potential; high solubility; low plasticity; moderate to high seismic transmission velocity, locally fracture controlled. | Moderate to high foundation strength; suitable only as raw material for portland cement. | Residual overburden is stony clay less than 0.5 meters deep; excavation moderate to difficult; high slope stability. | Few potential quarry sites because of scarps. |
| 5. CHALKY MARLY SHALE | Gently sloping plains. | Blue to blackish clay timey mart and shell agglomerate; chalky, marty, nodular thick-bedded; a few hard beds of sparry calcite; shale as thin beds common in upper part. | Moderate to low permeability; low to moderate corrosion potential; high solubility; low plasticity (some high); some moderate shrink-swell potential; low to moderate seismic transmission velocity. | High to moderate foundation; suitable for lime, raw material for portland cement, clay for bricks and earthenware. | Residual overburden is clay and stony clay 0.5 to 2.0 meters deep; excavation easy to difficult; high slope stability (some low). | Few good quarry sites. |
| 6. UNCONSOLIDATED SILT AND CLAY WITH SOME SAND AND GRAVEL | Floodplains and terraced benchs. | Flood plain deposits; gravel, sand, silt, clay, and organic matter. | High permeability; high flood potential; moderate corrosion potential; low solubility; moderate to low plasticity; variable shrink-swell potential; low to moderate seismic transmission velocity. | Moderate foundation strength; suitable for sand, gravel, fill and top soil. | No residual overburden; ex- cavation easy; low to mod- erate slope stability. | Numerous pit locations. |

DEFINITIONS

Permeability The capacity of a rock for transmitting a fluid.

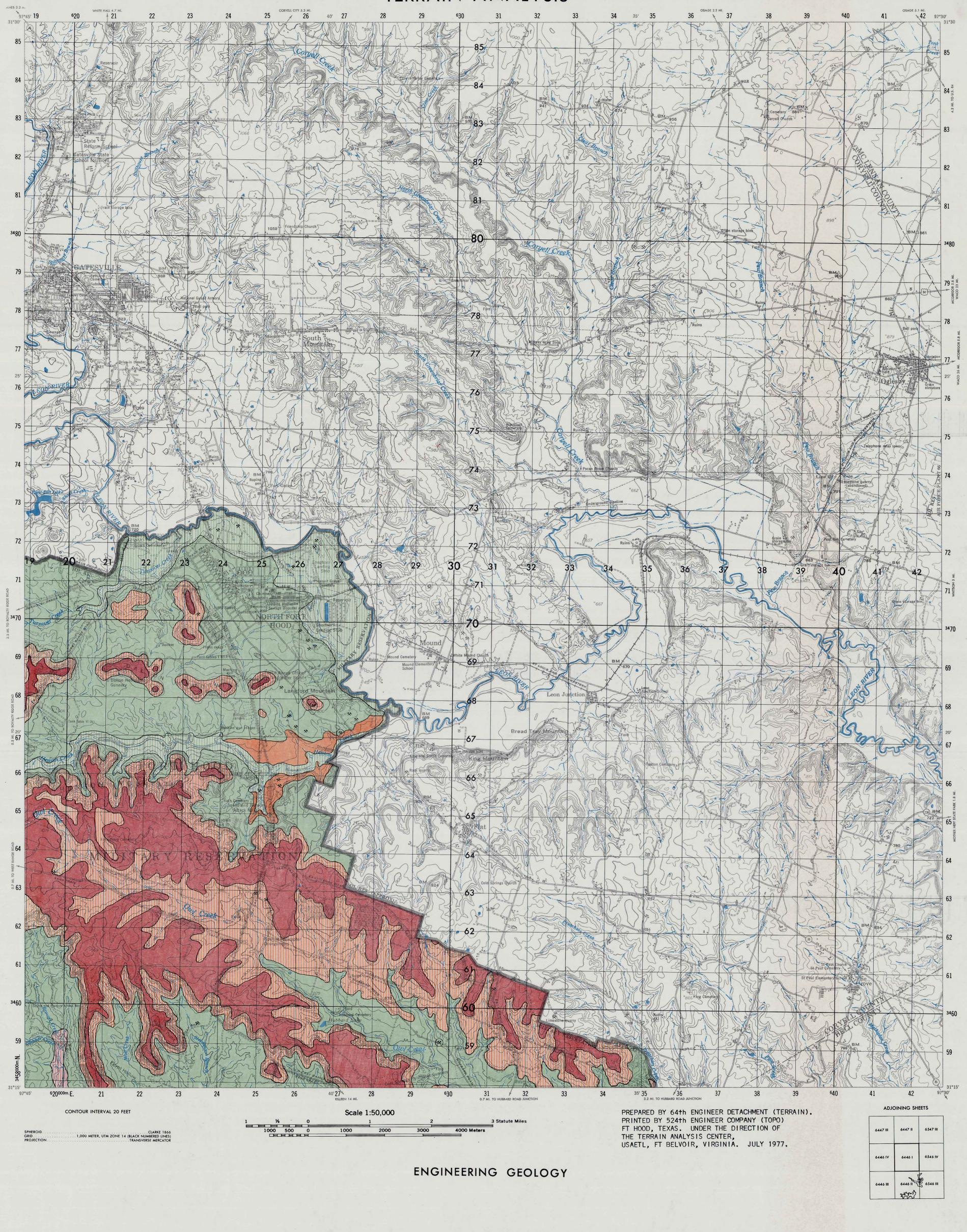
Corrosion Potential Susceptibility of a rock to chemical erosion.

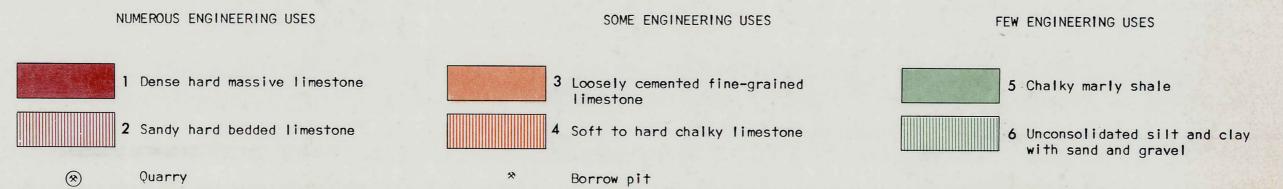
Solubility Susceptibility of a rock to solution.

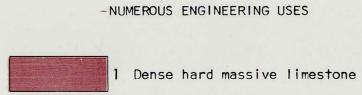
Plasticity Property that enables a rock to be permanently deformed without appreciable volume change.

F. SPECIAL PHYSICAL PHENOMENA

No militarily significant special physical phenomena at Fort Hood: no modern history of damage from earthquakes in the area, no volcanic features, no dunes, and no landslide areas.

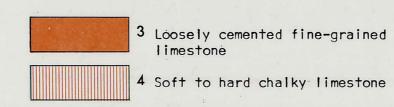






Quarry

2 Sandy hard bedded limestone



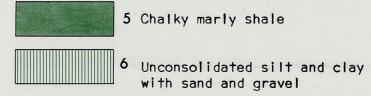
Borrow pit

43

ENGINEERING GEOLOGY

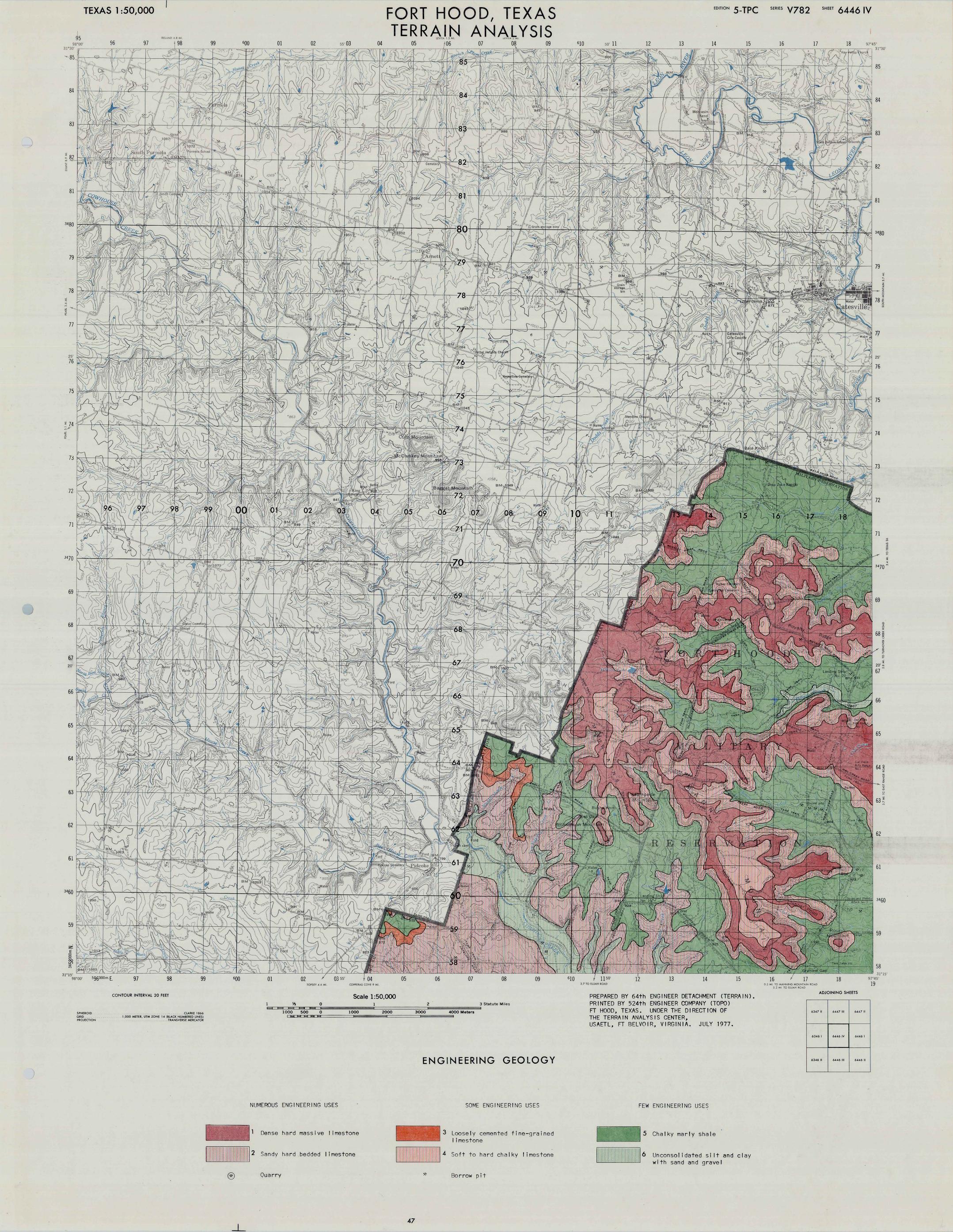
SOME ENGINEERING USES

FEW ENGINEERING USES



6445 I 6545 IV

6445 IV



and vehicles; concealment

from ground observation

generally fair for foot troops and unsuited for

vehicles year round.

On the Fort Hood Reservation there are three major vegetation types, forests, scrub, and grasslands, which are significant to military training or operations.

Forests, comprising the largest portion of the vegetation types, cover about 43% of the reservation. Of this 43%, nearly 39% is mixed coniferous and deciduous forests, with the remaining 4% being either pure coniferous or pure deciduous stands. The most common forest species that exist in either the mixed or pure stands are juniper, live oak, and Spanish oak.

Scrub vegetation covers approximately 14% of the reservation with mixed coniferous and deciduous scrub predominant. Scrub species are generally that of juniper, brush oaks, and mesquite.

Grasslands, mainly short grasses, make up about 38% of the vegetation on Fort Hood. Grasslands exist throughout the reservation and are generally large continuous areas. Most of the grass areas are kept short due to continual use by the military and open range grazing. Common grasses on Fort Hood are switch grass, Indian grass, and Canada wild rye.

Open areas cover the remaining 5% of the reservation. The open areas are either quarry and borrow pits or built-up areas. The vegetation type that affords the best cover and concealment possibility year round for foot troops and vehicles are the few stands of mature conifers largely in the southwestern part of the reservation. The more mature stands of deciduous and mixed coniferous and deciduous trees scattered throughout the reservation afford good cover year round and concealment from aerial and ground observation when the deciduous trees are in leaf. The location and extent of vegetation by types and sub-types are shown on the accompanying vegetation map. Descriptive details of each map unit are included in the table below.

| MAP UNIT | DESCRIPTION | DISTRIBUTION | REMARKS | COVER | CONCEALMENT |
|-------------|---|--|---|---|---|
| 1 | Coniferous trees, mostly juniper; heights averaging 6 m; trunks usually 5 cm in diameter; spaced 2-4 m apart; 50-100% crown cover density; branches down to ground level; short grasses in some areas under trees; 75% or more of each stand composed of coniferous species. | Very few stands on reservation; mostly along streams and the area between Copperas Cove and Robert Gray Airfield; stands contain largest trees on reservation. | Small cutting contract for trees mostly on the northern side; to terminate in 1978. | Cover from flat-trajectory fire of small arms generally good for foot troops. Distance at which most small arms fire can be blocked, 0-60 m. | Concealment from aerial and ground observation largely fair year round for foot troops and vehicles. |
| 2 | Coniferous trees, principally juniper; heights averaging 4.5 m; trunks usually 3.75 cm in diameter; spaced 1-3 m apart; 10-50% crown cover density; branches down to ground level; tree spacing allows for lesser crown cover; locally clumps may include up to 12 trees and reach 50 m in circumference; short grasses generally under trees; 75% or more of each stand composed of coniferous species. | Few stands on reservation; mostly on edges of mesa-like hillocks, bordering a few streams, and steeper slopes near edges of flat-topped hillocks. | Small cutting contract for trees mostly on the northern side; to terminate in 1978. | Cover from flat-trajectory fire of small arms generally fair for foot troops. Distance at which most small arms fire can be blocked, 60-250 m. | Concealment from aerial observation largely poor year round for foot troops and vehicles; concealment from ground observation generally fair year round for foot troops, and poor for vehicles. |
| 3 | Deciduous trees, mainly live oak and Spanish oak; heights averaging 6.5 m; trunks usually 15 cm in diameter; spaced approximately 3.5 m apart; 50-100% crown cover density; branches to within 2.5 m of ground level; leafless period generally mid-November through late March; 75% or more of each stand composed of one or more deciduous species. | Stands scattered on northern portion of reservation; mainly along well established drainage ways and undisturbed areas. | | Cover from flat-trajectory fire of small arms generally good for foot troops. Distance at which most small arms fire can be blocked, 0-60 m. | Concealment from aerial and ground observation largely good from April through mid-November for foot troops and vehicles when trees in leaf, and largely poor the rest of the year. |
| 4 | Deciduous trees, mainly live oak, Spanish oak, willow, and some mesquite; heights averaging 4.5 m; trunks usually 11.25 cm in diameter; spacing approximately 2 m; 10-50% crown cover density; branches to within 1.3 m of ground level; leafless period generally mid-November through late March; 75% or more of each stand composed of one or more deciduous species. | Small scattered stands found along stream courses. | | Cover from flat-trajectory fire of small arms is poor for foot troops. Distance at which most small arms fire can be blocked, greater than 250 m. | Concealment from aerial and ground observation largely poor for foot troops and vehicles; some concealment available when trees in leaf from April through mid-November. |
| 5 | Mixed coniferous and deciduous trees, primarily juniper and brush oak; heights average 5 m; trunk diameter up to 6.25 cm; spaced up to 3 m apart; 50-100% crown cover density; branches to ground level; small conifers may cover ground under deciduous trees; each stand contains roughly equal distribution of coniferous and deciduous species. | Stands exist throughout the reservation at all elevations. | | Cover from flat-trajectory fire of small arms generally good for foot troops. Distance at which most small arms fire can be blocked, 0-60 m. | Concealment from aerial and ground observation fair April through mid-November for foot troops and vehicles when trees in leaf; poor the rest of the year. |
| 6 | Mixed coniferous and deciduous trees, mainly juniper, oak, and willow; heights average 4.5 m; trunks usually 5.5 cm in diameter; spacing less than 1 m apart; 10-50% crown cover density; branches start at ground level; each stand contains roughly equal distribution of coniferous and deciduous species. | Stands exist throughout the reservation generally on higher elevations. | | Cover from flat-trajectory fire of small arms generally fair for foot troops. Distance at which most small arms fire can be blocked, 60-250 m. | Concealment from aerial and ground observation poor year round for foot troops and vehicles. |
| 7 | Coniferous scrub, mainly juniper; heights averaging 3 m; trunks usually 6.25 cm in diameter; spacing approximately 1 m; 50-100% crown cover density; branches down to ground level; grasses under stands usually less than 1 m high; 75% or more of each stand composed of coniferous species. | Few stands on reservation; mostly located at lower elevations and on steeper slopes. | | Cover from flat-trajectory fire of small arms generally fair for foot troops. Distance at which most small arms fire can be blocked, 60-250 m. | Concealment from aerial ob- servation largely poor year round for foot troops and vehicles; concealment from ground observation fair for foot troops and poor for vehicles. |
| 8 | Coniferous scrub, mainly juniper; heights averaging 3 m; trunks usually 6.25 cm in diameter; spaced approximately 2-4 m apart; 10-50% crown cover density; branches down to ground level; grasses under stands usually less than 1 m high; 75% or more of each stand composed on coniferous species. | Stands widely scattered throughout the reservation; mostly at lower elevations and on small hillocks. | | Cover from flat-trajectory fire of small arms is poor for foot troops. Distance at which most small arms fire can be blocked, greater than 250 m. | Concealment from aerial and ground observation largely poor year round for foot troops and vehicles. |
| 9 | Deciduous scrub, principally willow, post oak, and mesquite; heights averaging 4 m; trunks usually 12.5 cm in diameter; closely spaced; 50-100% crown cover density; branches start roughly 0.5 m from ground level; leafless period generally mid-November through late March; 75% or more of each stand composed of one or more deciduous species. | One continous stand along the eastern portion of Cowhouse Creek in the impact area. | | Cover from flat-trajectory fire of small arms generally fair for foot troops. Distance at which most small arms fire can be blocked, 60-250 m. | Concealment from aerial and ground observation largely fair from April through mid-November for foot troops and vehicles when trees in leaf and mostly poor the rest of the year. |
| 10 | Deciduous scrub, principally brush oaks, willow, and mesquite; heights averaging 4 m; trunks usually 6 cm in diameter; spaced approximately 2 m apart; 10-50% crown cover density; branches down to ground level; grasses less than 1 m high where present with deciduous scrub; leafless period generally mid-November through late March; 75% or more of each stand composed of one or more deciduous species. | Small stands widely scattered in the southwest portion of the reservation. | | Cover from flat-trajectory fire of small arms is poor for foot troops. Distance at which most small arms fire can be blocked, greater than 250 m. | Concealment from aerial and ground observation largely poor from April through mid-November for foot troops and vehicles, poor the rest of the year. |
| 11 | Mixed coniferous and deciduous scrub, mainly juniper, brush oaks, and mesquite; heights average less than 3 m; trunks usually 3.75 cm in diameter; spacing ranges from 0.5 m to 2 m; 50-100% crown cover density; branches down to ground level; small coniferous species occur under taller deciduous scrub, and grasses, if any, are short; each stand contains roughly equal distribution of coniferous and deciduous species. | Stands are scattered throughout the reservation. | | Cover from flat-trajectory fire of small arms generally fair for foot troops. Distance at which most small arms fire can be blocked, 60-250 m. | Concealment from aerial and ground observation largely poor for foot troops and vehicles. |
| 12 | Mixed coniferous and deciduous scrub, primarily of juniper, brush oaks, willow and mesquite; heights averaging less than 3 m; trunks usually 3 cm in diameter; closely spaced; 10-50% crown cover density; branches down to ground level; grasses under scrub, if any, are short; each stand contains roughly equal distribution of conferous and deciduous species. | Stands exist primarity in the southern portion of the reservation on both steep slopes and flat areas. | | Cover from flat-trajectory fire of small arms is poor for foot troops. Distance at which most small arms fire can be blocked, greater than 250 m. | Concealment from aerial and ground observation poor year round for foot troops and vehicles. |
| 13 | Short grasses, generally less than 1 m high; species include switch grass, Indian grass, and Canada wild rye; green in summer, brown in winter and through periods of drought; trees do not exceed 10% of ground cover. | Short grasses are widely distributed throughout the reservation and are most common to flat areas. | Grazing and continual military operations help maintain grasses at less than 1 m in height. | No cover for foot troops. | No concealment from aerial observation for foot troops and vehicles; concealment from ground observation largely poor for foot troops and unsuited for vehicles year round. |
| 14 | Tall grasses, generally greater than 1 m high; species | There are a few small tall | | No cover for foot troops. | No concealment from aerial observation for foot troops |

out the reservation.

grass areas located through-

14 Tall grasses, generally greater than 1 m high; species

include switch grass, Indian grass, and Canada wild

periods of drought; trees do not exceed 10% of ground

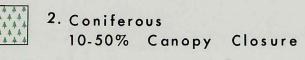
rye; green in summer, brown in winter and through

cover.

FORT HOOD, TEXAS TERRAIN ANALYSIS



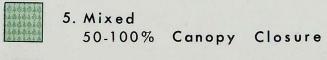
1. Coniferous 50-100% Canopy Closure

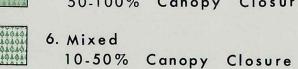


4. Deciduous

3. Deciduous 50-100% Canopy Closure

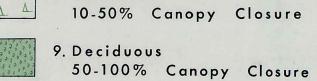
10-50% Canopy Closure





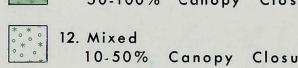


50-100% Canopy Closure 8. Coniferous

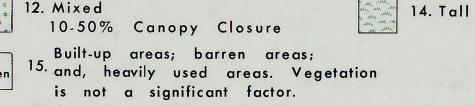


10. Deciduous 10-50% Canopy Closure

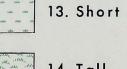
11. Mixed 50-100% Canopy Closure

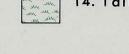


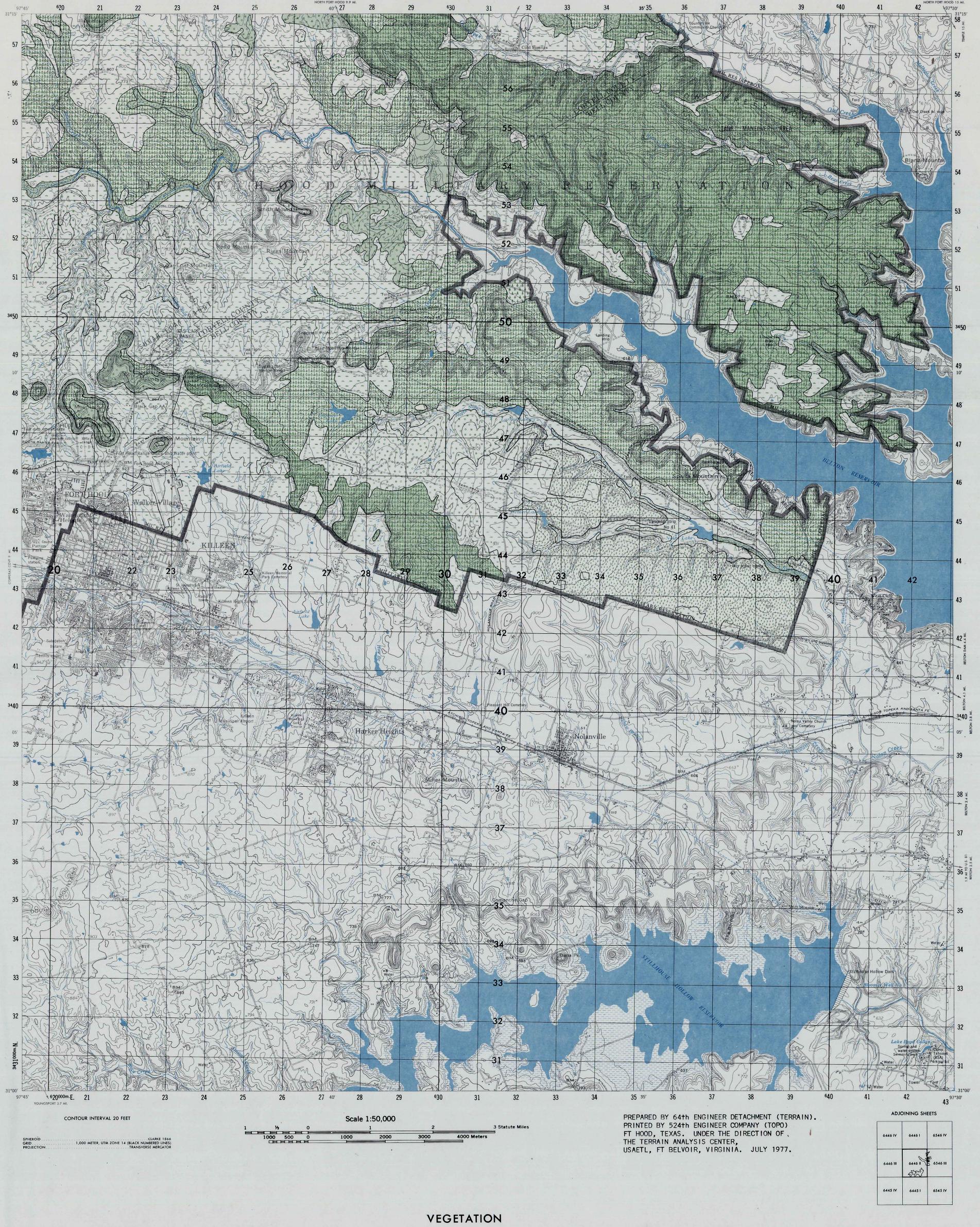
10-50% Canopy Closure

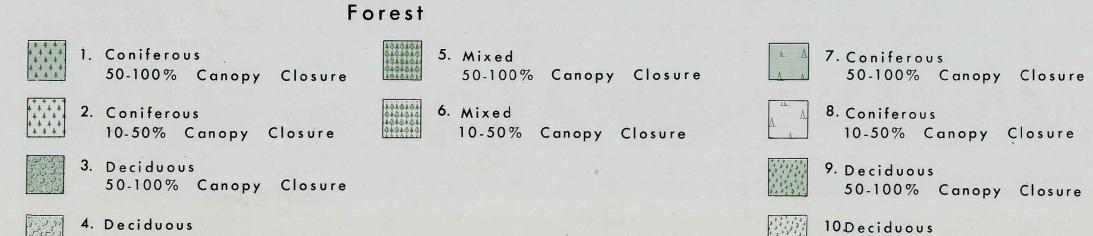




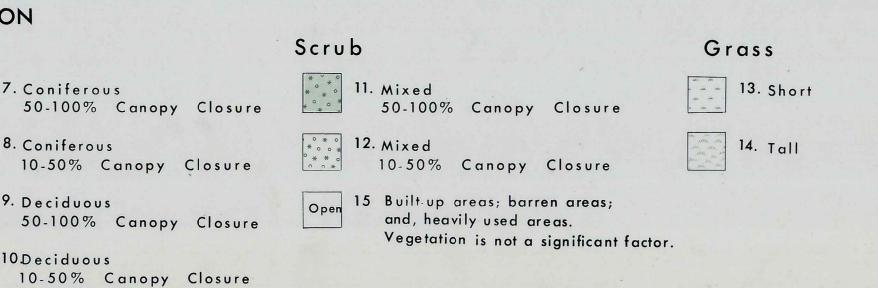








10-50% Canopy Closure



10. Deciduous

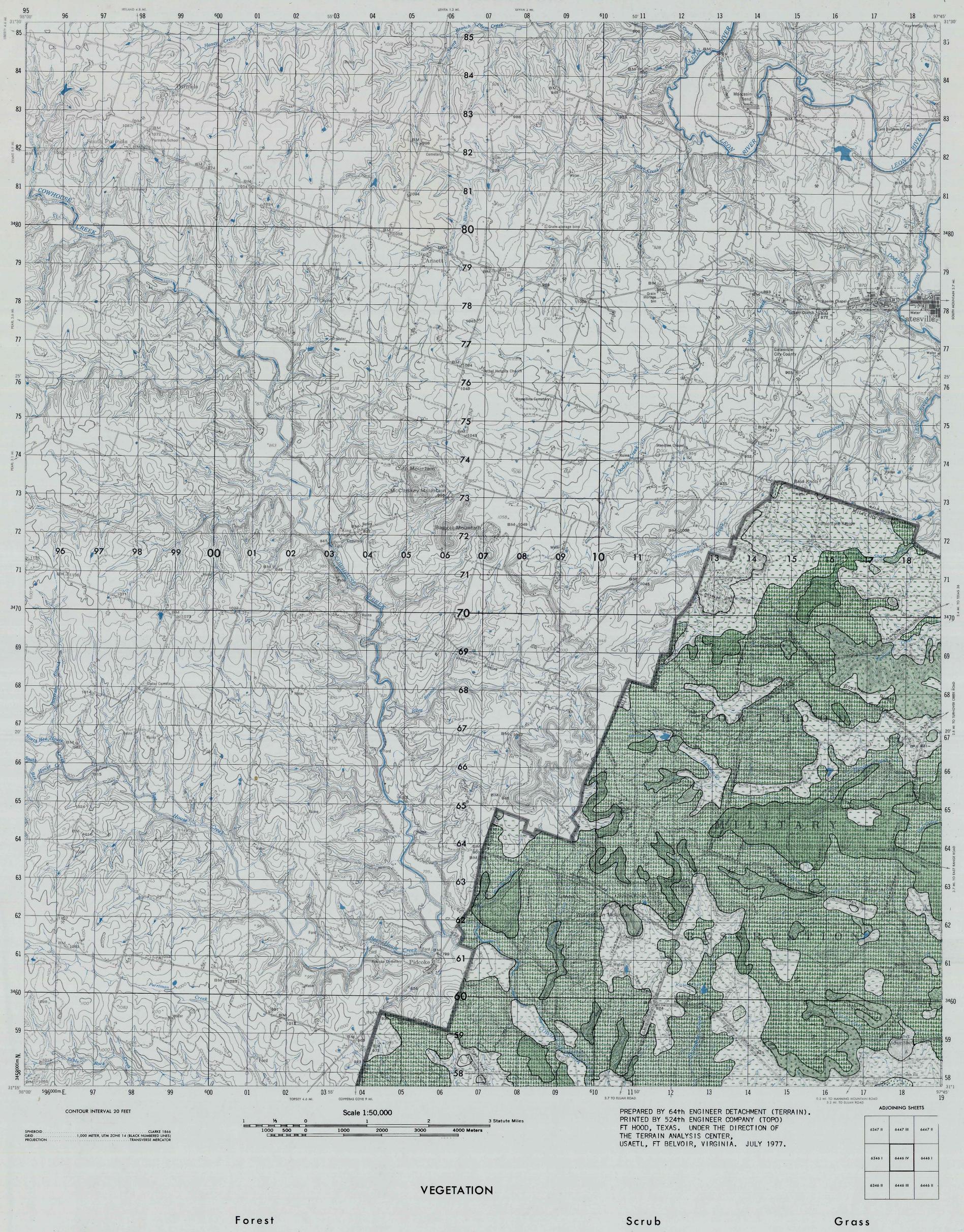
55

10-50% Canopy Closure

4. Deciduous

10-50% Canopy Closure

FORT HOOD, TEXAS TERRAIN ANALYSIS



1. Coniferous 50-100% Canopy Closure

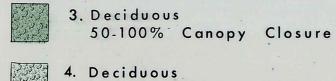
10-50% Canopy Closure

10-50% Canopy Closure

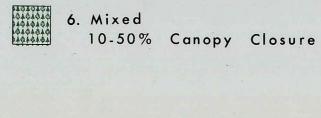


5. Mixed 50-100% Canopy Closure

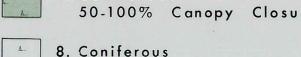


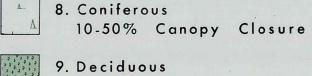


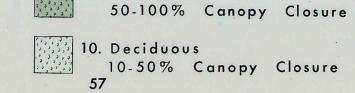
2. Coniferous

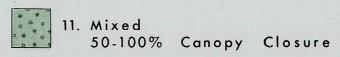


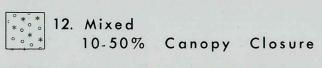
7. Coniferous 50-100% Canopy Closure



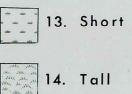








Open 15. Built-up areas; barren areas; and, heavily used areas. Vegetation is not a significant factor.



GENERAL CLIMATIC DESCRIPTION

Fort Hood is located near the boundary of two climatic zones. To the west is the semi-arid steppe climate, while to the east it is a warm, rainy climate. Fort Hood, therefore, has a combination of climates having cool, rainy winters and hot, dry summers. Highest temperatures occur in July and August, the mean daily maximum being 34.4°C (94°F). Lowest temperatures occur in December, January, and February with mean daily minimum temperatures between 2.7 and 3.8°C (37-39°F); the lowest ever recorded -12.7°C (9°F). The average annual precipitation is 771mm (30in) the maximum occuring in September, the minimum in July. Measurable amounts of snow occur from December through March, with only trace amounts in October and November. The mean annual snowfall is 94mm (3.7in), the majority of which falls in February. Surface winds are out of the south and southeast for most of the year. Winds from the north, north-west and northeast occur in September through February, becoming dominant in February. These nothern winds are associated cold fronts which diminish in frequency in March. At this time and continuing through to Fall, the major factor in Fort Hood's weather is the Bermuda High which brings moist tropical air masses from the Gulf of Mexico. As a relult, thunderstorm activity is on the increase, with maximum number occuring in May.

SEASONAL DESCRIPTIONS

WINTER The months of December, January, and February are the worst for flying and ground exercises. This is due to the frequent fronts that pass through the area, an average of 5 to 6 per month. These fronts bring low ceilings, poor visibility, and precipitation usually in the form of light rain, drizzle, or possibly snow. Temperatures range from the low 40's to low 60's (5-17°C) with alternate warm and cold periods being the usual.

SPRING Weather during the months of March, April, and May shows considerable improvement over winter. Frontal systems number about 2 to 3 per month and are associated with Maritime Polar Air rather than Continental Polar Air, so as a result the mean daily temperature rises markedly. The most hazardous flying weather is the thunderstorm activity that accompanies or proceeds the Maritime Polar Fronts. Gusty surface winds may also be present. Precipitation for the season is mainly in the form of showers and thundershowers.

SUMMER Flying weather is good during the summer months, with the number of fronts decreasing sharply. Airflow from the Gulf of Mexico predominates. This combination of moisture and summertime heating results in afternoon and evening thunderstorms. Disturbances in the Gulf can cause hazardous flying, with periods of 6 to 8 hours of rain, causing low ceilings and poor visibility. Hurricanes in the Gulf of Mexico may occasionally cause rain and low ceilings for periods lasting 6 to 18 hours.

AUTUMN The weather for the autumn months begins fair, but becomes increasingly poorer in October and November, with the first freeze expected around 15 November. Frontal passages become more frequent, and with them come frontal thunderstorms and gusty surface winds. During September it is common for the frontal systems to become stationary over the area, causing 12 to 72 hours of low ceilings, poor visibility and light rain or drizzle.

CLIMATE (Continued)

| | | | | | | 1. TEM | PERATURE | - | | | | | | | |
|--|--------------|------------|------------|------------|------------|--------------|------------|-------|-------|-------|---------------|------------|------------|-------|--------------------|
| Parameter Description | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | 0ct | Nov | Dec | Ann | Period o Record |
| bsolute Maximum Temperature | °C | 30.0 | 31.6 | 38.3 | 36.6 | 36.6 | 40.0 | 42.7 | 41.1 | 40.5 | 36 . 1 | 31.6 | 31.6 | 42.7 | 1950-197 |
| | °F | 86 | 89 | 101 | 98 | 98 | 104 | 109 | 106 | 105 | 97 | 89 | 89 | 109 | 1950-197 |
| lean Daily Maximum | ° C | 13.8 | 15.5 | 20.5 | 25.5 | 28.3 | 31.6 | 34.4 | 34.4 | 30.5 | 26.1 | 20.0 | 15.0 | 24.4 | 1950-197 |
| | °F | 57 | 60 | 69 | 78 | 83 | 89 | 94 | 94 | 87 | 79 | 68 | 59 | 76 | 1950-197 |
| Mean Daily Minimum | °C | 2.7 | 3.8 | 8.8 | 15.0 | 18.3 | 21.6 | 22.7 | 22.7 | 20.0 | 14.4 | 9.4 | 3.8 | 13.8 | 1950-197 |
| | °F | 37 | 39 | 48 | 59 | 65 | 71 | 73 | 73 | 68 | 58 | 49 | 39 | 57 | 1950-197 |
| absolute Minimum | °C | -12.2 | -t2.7 | -6.I | 0 | 5.5 | 10.5 | 16.1 | 16.1 | 8.3 | 1.1 | -5.5 | -10.0 | -12.7 | 1950-197 |
| | *F | 10 | 9 | 21 | 32 | 42 | 51 | 61 | 61 | 47 | 34 | 22 | 14 | 9 | 1950-197 |
| lean Number Days with laximum Temperature≽90°F 32.2°C) | | 0 | 0 | < ½ | į. | 4 | 18 | 26 | 28 | 12 | 2 | 0 | 0 | 91 | 1960-197 |
| dean Number Days with Ninimum Temperature≤32°F 0.0°C) | | 11 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 28 | 1960-19 |
| ormal Heating Degree Days Base 65°F/18.3°C) | | 499 | 370 | 201 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 225 | 440 | - | 1950-19 |
| Normal Cooling Degree Days (Base 65°F/18.3°C) | | 0 | 0 | 0 | 78 | 282 | 486 | 614 | 614 | 417 | 0 | 0 | 0 | - | 1950-196 |
| lean Dew Point | °C | 1.1 | 2.2 | 5.5 | 12.7 | 16.1 | 18.8 | 18.8 | 18.8 | 17.7 | 11.6 | 7.2 | 2.7 | 11.1 | 1960-19 |
| | ° F | 34 | 36 | 42 | 55 | 61 | 66 | 66 | 66 | 64 | 53 | 45 | 37 | 52 | 1960-19 |
| | | | | | | 2. PREC | CIPITATIO | DN | , | | | | | · | |
| Parameter Description | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | 0ct | Nov . | Dec | Ann | Period o Record |
| ean Monthly Precipitation | mm | 55.8 | 61.0 | 48.1 | 71.1 | 105.0 | 71.1 | 33.0 | 47.0 | 111.7 | 61.0 | 73.5 | 38.1 | 771.6 | 1950-19 |
| | in | 2.1 | 2.4 | 1.9 | 2.8 | 4.1 | 2.8 | 1.3 | 1.8 | 4.4 | 2.4 | 2.9 | 1.5 | 30.4 | 1950-19 |
| osolute Maximum | mm | 218.4 | 160.0 | 109.2 | 335.2 | 353.0 | 160.0 | 114.3 | 213.3 | 187.9 | 216.0 | 116.8 | 137.0 | - | 1950-19 |
| | In | 8.61 | 6.31 | 4.34 | 13.23 | 13.9 | 6.32 | 4.5 | 8.4 | 7.43 | 8.5 | 4.6 | 5.43 | - | 1950-19 |
| osolute Minimum | mm | 5.3 | 12.9 | 0.5 | 5.3 | 24.9 | 1.2 | 0.25 | trace | trace | 0.0 | 3.5 | trace | - | 1950-19 |
| | in | 0.21 | 0.51 | 0.02 | 0.21 | 0.98 | 0.05 | 0.01 | trace | trace | 0.0 | 0.14 | trace | - | 1950-19 |
| ean Number Days with recipitation >0.1" | | 4 | 5 | 3 | 6 | 5 | 5 | 2 | 4 | 4 | 5 | 4 | 4 | 51 | 1951-19 |
| 2.54 mm) ean Number Days with | | 0.5 | 1.4 | 3.2 | 6.0 | 5.5 | 5.0 | 2.5 | 4.5 | 5.0 | 2.0 | 2.0 | 0.7 | 38.3 | 1950-19 |
| nunderstorms ean Monthly Snowfall | mm | 25.4 | 58.4 | 5.0 | 0 | 0 | 0 | 0 | 0 | 0 | trace | trace | 5.0 | 93.9 | 1950-19 |
| · · · · · · · · · · · · · · · · · · · | in | 1.0 | 2.3 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | trace | trace | 0.2 | 3.7 | 1950-19 |
| ean Snow Depth | mm | 10.1 | 22.8 | 2.54 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.54 | 2.54 | 33.0 | 1950-19 |
| | īn | 0.4 | 0.9 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.1 | 1.3 | 1950-19 |
| aximum Snow Depth | mm | 121.9 | 208.2 | 30.4 | trace | trace | trace | 0 | 0 | 0 | trace | 45.7 | 38.1 | - | 1950-19 |
| | in | 4.8 | 8.2 | 1.2 | trace | trace | trace | 0 | 0 | 0 | trace | 1.8 | 1.5 | - | 1950-19 |
| ean Number Days with nowfall≥1.5" (38.1mm) | | 0.2 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0.062 | - | 1950-19 |
| | | | | | | 3 . I | HUMIDITY | | | | | | | | |
| Parameter Description | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | 0ct | Nov | Dec | Ann | Period Record |
| Mean Percent Relative Humidity | | 66.4 | 64.1 | 60.5 | 64.8 | 68.7 | 65.9 | 60.0 | 58.7 | 63.3 | 62.1 | 64.4 | 64.4 | - | 1950-19 |
| | | | *. | | | 4. | WIND | | | | | | | | |
| Parameter Description | 1 | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | 0ct | Nov | Dec | Ann | Period Record |
| Percent Frequency of Surface Speed≥28 Knots(32.2mph/51.9 | e Wind | | 0.1 | 0 | 0.1 | · | | | _ | 0.1 | | 0.1 | 0.2 | _ | 1950-1 |
| Percent Frequency of Surface Speed ≥ 17 Knots(19.5mph/31.5 | | 6.6 | 7.1 | 8.9 | 9.1 | 7.6 | 5.6 | 2.9 | 1.9 | 1.5 | 3.1 | 4.7 | 5.8 | _ | 1951-1 |
| astest One-Minute Wind | Knots | | 7•1 51 | 47 | 80 | 7.0 51 | 45 | 52 | 45 | 49 | 62 | 58 | 48 | 80 | 1950-1 |
| Speed Speed | kmph | 76 | 94.5 | 87 | 148 | 94.5 | 83.3 | 77.8 | 83.3 | 90.8 | 114.8 | 66.7 | 40 89 | 148 | 1950-1 |
| Mean Number Days with Sur- | 0100 | 1.7 | 1.8 | 2.4 | 2.5 | 1.7 | 1.3 | 0.4 | 0.2 | 0.2 | 0.7 | 1.4 | 1.8 | - | 1951-1 |
| face Wind 17 Knots (19.5 mph/31.5 Kmph) and No | 0700 | 1.9 | 1.6 | 2.4 | 1.5 | 1.5 | 1.1 | 0.2 | 0.3 | 0.2 | 0.5 | 1.2 | 1.5 | - | 11001-1 |
| Precipitation | 1300 | 3.6 | 3.7 | 4.8 | 4.5 | 3.3 | 2.2 | 1.2 | 0.5 | 0.7 | 1.6 | 2.6 | 3.6 | - | Ħ |
| | 1900 | 1.4 | 1.7 | 2.4 | 3.1 | 3.2 | 2.7 | 2.0 | 1.0 | 0.5 | 0.7 | 0.7 | 0.9 | - | ** |
| ean Number Days with | 0100 | 9.0 | 11.4 | 13.0 | 12.1 | 12.4 | 5.8 | 3.0 | 1.9 | 9.7 | 14.2 | 13.2 | 11.3 | - | 1951- |
| | | | | | | | | | | | | | | | |
| urface Wind 4-10 Knots 4.61-11.52 mph/7.4-18.5 | 0700 | 1.9 | 1.6 | 2.4 | 1.5 | 1.5 | 1.1 | 0.2 | 0.3 | 0.2 | 0.5 | 1.2 | 1.5 | - | 71 |
| urface Wind 4-10 Knots 4.61-11.52 mph/7.4-18.5 mph); and Temperature 3-89 F (0.6-31.7C); nd No Precipitation | 0700 1300 | 1.9 3.6 | 1.6 3.7 | 2.4 4.8 | 1.5 4.5 | 1.5 3.3 | 1.1 2.2 | 0.2 | 0.3 | 0.2 | 0.5 | 1.2 2.6 | 1.5 3.6 | - | 11 |

5. VISIBILITY

| Parameter Description | hr(s) | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | 0ct | Nov | Dec | Period of Record |
|--|---------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------------------------|
| Mean Number Days Visibility Equal to or Less than 0.5 miles (0.8 KM) | - | 00.22 | 00.13 | 00.08 | 00.04 | 00.03 | 00.01 | 00.0 | 00.0 | 10.00 | 00.05 | 00.09 | 00.19 | 1951-1960, 1962-1968 |
| Percent Frequency Ceiling≤1500' | 00-0200 | 23.70 | 23.40 | 17.20 | 21.60 | 15.90 | 06.80 | 02.2 | 02.3 | 09.40 | 09.10 | 14.60 | 18.00 | 11 |
| (457.2m) or Visibility≤3 miles (4.82 Km) | 03-0500 | 28.80 | 27.00 | 24.30 | 30.50 | 23.30 | 12.50 | 04.5 | 05.3 | 14.70 | 13.40 | 18.60 | 20.20 | " |
| | 06-0800 | 29.50 | 28.10 | 25.80 | 30.20 | 27.40 | 18.20 | 07.5 | 07.9 | 17.90 | 16.60 | 22.80 | 23.50 | ** |
| | 09-1100 | 25.00 | 25.80 | 22.20 | 23.90 | 14.70 | 07.70 | 02.4 | 04.1 | 12.40 | 12.70 | 18.80 | 22.20 | " |
| | 12-1400 | 18.70 | 17.30 | 12.40 | 11.80 | 05.90 | 02.50 | 00.9 | 00.8 | 04.20 | 04.80 | 11.20 | 14.90 | " |
| | 15-1700 | 15.20 | 14.10 | 08.50 | 07.10 | 04.80 | 02.30 | 00.2 | 00.7 | 02.70 | 04.10 | 09.30 | 12.10 | 11 |
| | 18-2000 | 16.30 | 12.50 | 08.70 | 06.50 | 04.90 | 02.70 | 00.6 | 00.5 | 03.00 | 04.00 | 09.30 | 12.40 | " |
| | 21-2300 | 19.50 | 15.60 | 10.30 | 10.10 | 06.90 | 03.00 | 00.5 | 00.7 | 04.20 | 05.00 | 11.10 | 14.30 | 11 |
| Percent Frequency Ceiling ≤ 300° | 00-0200 | 06.20 | 05.50 | 02.80 | 02.10 | 01.20 | 00.30 | 00.0 | 00.2 | 00.50 | 01.20 | 03.10 | 05.50 | 11 |
| (91.4m) or Visibility≤l mile (1.61 Km) | 03-0500 | 07.70 | 06.20 | 04.10 | 03.80 | 01.90 | 00.70 | 00.1 | 00.4 | 01.10 | 01.70 | 04.40 | 06.40 | ** |
| | 06-0800 | 08.70 | 08.00 | 05.00 | 05.30 | 02.70 | 01.40 | 00.3 | 00.3 | 01.90 | 03.00 | 05.40 | 07.70 | 11 |
| | 09-1100 | 06.30 | 05.20 | 02.40 | 02.00 | 00.80 | 00.10 | 00.0 | 1.00 | 00.30 | 01.10 | 02.50 | 05.20 | ** |
| | 12-1400 | 03.70 | 02.10 | 01.50 | 00.70 | 00.10 | 00.00 | 00.1 | 00.0 | 00.10 | 00.40 | 01.50 | 01.80 | 11 |
| | 15-1700 | 02.50 | 01.70 | 00.90 | 00.20 | 00.10 | 00.20 | 00.0 | 00.1 | 00.10 | 00.40 | 00.90 | 01.80 | " |
| | 18-2000 | 03.50 | 03.00 | 01.20 | 00.70 | 00.50 | 00.30 | 00.1 | 00.1 | 00.10 | 00.50 | 01.80 | 02.70 | ** |
| | 21-2300 | 05.20 | 04.20 | 02.20 | 00.90 | 00.80 | 00.10 | 00.0 | 00.0 | 00.30 | 00.70 | 02.30 | 03.80 | tt |
| Mean Numbers Days with Sky Cover | 0010 | 13.80 | 12.50 | 13.70 | 11.60 | 13.40 | 18.00 | 23.6 | 23.0 | 20.20 | 21.10 | 15.90 | 15.70 | 1951-1968 |
| ≤30 %, and Visibility≥3 miles (4.82 Km) | 0700 | 10.40 | 09.60 | 09.70 | 08.20 | 07.00 | 09.70 | 14.3 | 15.6 | 14.80 | 15.90 | 12.20 | 12.50 | **1 |
| | 1300 | 09.90 | 09.50 | 10.00 | 09.30 | 08.40 | 08.50 | 10.1 | 10.1 | 10.50 | 15.40 | 12.20 | 11.40 | ** |
| | 1900 | 13.10 | 11.10 | 12.70 | 11.60 | 12.30 | 16.00 | 16.0 | 15.3 | 17.80 | 19.50 | 15.50 | 14.70 | ** |
| Mean Number Days Celling ≥1000' | 0100 | 25.50 | 23.50 | 27.70 | 26.40 | 28.50 | 28.80 | 30.7 | 30.5 | 27.90 | 29.20 | 27.00 | 26.60 | 1951-1960, 1962-1968 |
| (304.8 m) and Visibility≥3 miles (4.82 Km) | 0700 | 24.10 | 22.10 | 25.80 | 24.30 | 26.20 | 27.00 | 29.5 | 29.4 | 25.80 | 27.30 | 25.10 | 25.10 | 1902-1900 |
| | 1300 | 27.00 | 24.70 | 28.70 | 28.10 | 29.90 | 29.50 | 30.8 | 30.8 | 29.20 | 30.10 | 27.60 | 27.70 | 11 |
| | 1900 | 26.90 | 25.40 | 29.00 | 28.50 | 30.00 | 29.40 | 30.9 | 30.8 | 29.40 | 30.10 | 28.10 | 27.90 | ** |
| Mean Number Days with Ceiling ≥ 2000' (609.6 m) and Visibility | 0100 | 11.00 | 12.70 | 14.20 | 13.30 | 14.00 | 16.00 | 21.5 | 22.8 | 19.10 | 17.30 | 15.20 | 15.40 | 1951-1968 |
| ≥ 3 miles (4.82 km) and Surface Winds≤10 Knots (11.15 mph/18.53 | 0700 | 11.80 | 11.30 | 12.80 | 11.00 | 12.40 | 14.20 | 20.3 | 20.2 | 16.20 | 16.20 | 13.40 | 13.90 | 11 |
| Kmph) | 1300 | 12.10 | 10.80 | 11.80 | 11.90 | 14.60 | 16.90 | 21.3 | 23.8 | 20.80 | 18.30 | 14.60 | 13.30 | 11 |
| | 1900 | 16.40 | 15.80 | 16.80 | 15.10 | 15.70 | 16.30 | 19.4 | 22.9 | 22.60 | 21.80 | 18.20 | 18.40 | 11 |
| Mean Number Days with Ceiling > 2500' (762 m) and Visibility | 0100 | 22.00 | 19.60 | 23.40 | 20.50 | 23.30 | 26.40 | 29.9 | 30.I | 26.20 | 27.10 | 23.60 | 23.70 | 1951-1960 1962-1968 |
| ≥3 miles (4.82 Km) | 0700 | 19.60 | 18.20 | 20.50 | 17.30 | 18.90 | 20.70 | 27.5 | 27.6 | 23.40 | 24.00 | 21.00 | 21.50 | 1302 1300 |
| | 1300 | 22.70 | 20.40 | 24.60 | 23.20 | 25.70 | 28.30 | 30.2 | 30.1 | 26.90 | 27.90 | 24.70 | 23.90 | ** |
| | 1900 | 24.40 | 22.70 | 27.00 | 26.70 | 28.40 | 28.80 | 30.7 | 30.7 | 28.40 | 29.00 | 26.20 | 26.10 | " |
| Mean Number Days with Celling ≥ 6000' (1828.8 m) and Visibil- | 0100 | 20.20 | 17.80 | 21.50 | 18.30 | 21.50 | 25.30 | 29.5 | 29.2 | 25.10 | 26.00 | 21.10 | 21.40 | ** |
| ity ≥ 3 miles (4.82 Km) | 0700 | 17.80 | 16.40 | 18.30 | 14.90 | 16.20 | 19.00 | 26.6 | 26.6 | 22.50 | 22.40 | 18.60 | 19.20 | 11 |
| | 1300 | 20.20 | 18.30 | 21.10 | 18.50 | 18.80 | 20.20 | 24.8 | 24. l | 21.70 | 23.60 | 21.30 | 22.20 | 11 |
| | 1900 | 22.40 | 20.20 | 24.30 | 23.60 | 25.10 | 27.20 | 29.2 | 28.8 | 26.50 | 27.00 | 23.30 | 23.60 | 11 |
| Mean Number Days with Ceiling ≥10,000' (3048 m) and Visibility | 0010 | 19.60 | 16.90 | 20.50 | 17.90 | 20.60 | 24.80 | 29.2 | 28.7 | 24.40 | 25.30 | 20.10 | 20.40 | " |
| ≥3 miles (4.82 Km) | 0700 | 16.90 | 15.20 | 16.80 | 14.10 | 14.60 | 18.10 | 25.6 | 25.4 | 31.30 | 21.40 | 17.30 | 18.30 | ** |
| | 1300 | 19.10 | 17.00 | 20.10 | 17.40 | 16.90 | 19.50 | 24.1 | 23.2 | 20.80 | 22.30 | 20.10 | 21.00 | 11 |
| | 1900 | 21.70 | 19.00 | 23.00 | 22.30 | 22.90 | 26.40 | 28.3 | 27.8 | 25.40 | 26.20 | 22.40 | 22.40 | ** |
| Percent Frequency Ceiling≤5000' (1524 Km) or Visibility≤5 miles (8.047 Km) | - | 34.60 | 34.60 | 31.00 | 37.10 | 33.20 | 22,80 | 9.8 | 10.7 | 19.30 | 19.50 | 28.70 | 29.60 | Ħ |

6. NAUTICAL TWILIGHT, SUNRISE AND SUNSET

| | Nautical Tw | ilight | | | | Nautical Tw | ilight | | |
|-------------|-------------|--------|---------|--------|--------------|-------------|--------|---------|--------|
| Date | Begin | End | Sunrise | Sunset | Date | Begin | End | Sunrise | Sunset |
| January | 0633 | 1836 | 0729 | 1740 | July 1 | 0429 | 2040 | 0530 | 1939 |
| January II | 0634 | 1844 | 0730 | 1747 | July II | 0434 | 2038 | 0535 | 1937 |
| January 21 | 0633 | 1852 | 0729 | 1756 | July 21 | 0441 | 2033 | 0541 | 1933 |
| February I | 0629 | 1900 | 0723 | 1806 | August | 0449 | 2024 | 0547 | 1926 |
| February II | 0622 | 1908 | 0716 | 1815 | August 11 | 0457 | 2014 | 0554 | 1918 |
| February 21 | 0614 | 1916 | 0707 | 1823 | August 21 | 0505 | 2002 | 0600 | 1907 |
| March ! | 0606 | 1921 | 0658 | 1829 | September I | 0513 | 1948 | 0607 | 1855 |
| March 11 | 0554 | 1928 | 0648 | 1836 | September II | 0520 | 1935 | 0612 | 1842 |
| March 21 | 0542 | 1935 | 0634 | 1843 | September 21 | 0526 | 1921 | 0618 | 1829 |
| April | 0527 | 1943 | 0620 | 1850 | October 1 | 0532 | 1909 | 0624 | 1816 |
| April II | 0514 | 1950 | 0608 | 1856 | October !! | 0538 | 1856 | 0631 | 1805 |
| April 21 | 0502 | 1958 | 0557 | 1903 | October 21 | 0545 | 1846 | 0638 | 1753 |
| May I | 0450 | 2006 | 0547 | 1910 | November | 0552 | 1836 | 0646 | 1743 |
| May II | 0440 | 2015 | 0538 | 1917 | November | 0600 | 1830 | 0654 | 1735 |
| May 21 | 0433 | 2023 | 0532 | 1923 | November 21 | 0608 | 1826 | 0703 | 1730 |
| June I | 0427 | 2031 | 0528 | 1930 | December I | 0615 | 1824 | 0711 | 1728 |
| June II | 0425 | 2036 | 0526 | 1935 | December II | 0622 | 1826 | 0719 | 1729 |
| June 21 | 0425 | 2040 | 0527 | 1938 | December 21 | 0628 | 1830 | 0725 | 1733 |

I. CROSS-COUNTRY MOVEMENT

| MAP UNIT | GENERALIZED TERRAIN CONDITIONS | MOVEMENT OF TRACKED VEHICLES* | MOVEMENT OF WHEELED VEHICLES** | MOVEMENT OF FOOT TROOPS |
|-------------|---|---|--|--|
| 1 | Dominantly level, open, cleared areas. Generally level plains to slightly undulating areas. Slopes less than 20%. Vegetation ranges from barren areas to short and tall grasses. Soils are predominantly clays that make an extreme hardpan when dry and can be extremely dusty. When wet, these clays become quite slick. In many areas, particularly on hilltops, the soil cover is very thin, overlying a limestone bedrock. The depth to the water table is seasonal but averages from one-half meter deep to over two meters deep: | Generally easy in all directions for long distances for tracked vehicles (M60 tank and M113 APC) during dry periods. Dust signature may be a problem during dry periods. Wet conditions slightly hinder progress due to loss of traction in slick clay soils. | Movement fairly easy throughout year. Caution must be exercised when driving through grassy areas to avoid stumps and depressions. Some rutting and ditches will have to be bypassed. Wet periods may slow movement some, but should not be significant. | Movement unrestricted year-round. Some caution should be used in areas of tall grasses. |
| 2 | Bottomlands and flood plains of rivers and creeks. Generally level to slightly sloping (0-8%) areas along watercourses composed of silty, clayey and loamy soils. Vegetation is primarily larger deciduous trees directly adjacent to the watercourse. Most of the area is comprised of short grasses, but some stands of scrub and light forest exist in the floodplain. Movement characteristics are fairly good when the area is dry, but movement is precluded during wet periods, and the restrictions may remain after rainstorms for periods up to seven days. The water table is usually quite high due to the nearness of the watercourse in the area. | Generally easy during dry periods for tracked vehicles to move parallel to watercourses. Some stands of vegetation may moderately limit choice of movement direction. Lateral movement is possible but only for short distances before a watercourse is encountered. During wet periods, vehicles encounter miring conditions that preclude vehicle movement in the floodplain. | Movement fairly easy in dry periods. Stands of trees and brush should be avoided or bypassed. Wet periods will preclude movement in these areas. Severe miring can be expected during the wet periods. | Unrestricted movement possible during dry periods. During wet periods, considerable miring occurs. During rainstorms, care should be taken to avoid flash flooding. |
| 3 | Dominantly open, clear areas of silty, clayey and loamy soils. Movement characteristics in this area are similar to those in Area 1 during dry periods. Soil characteristics during wet periods severely limit trafficability in the area. Vegetation is predominantly grasses. Slopes are generally less than 20%. Soil depth averages about one meter. The water table is usually relatively low, but may be seasonally high. | Generally easy movement for tracked vehicles in all directions and for long distances during dry periods. Dust signature could be a problem during dry periods. Wet periods produce slight miring conditions for tracked vehicles and considerably hinder vehicular movement. | Movement fairly easy in dry periods. Caution should be exercised when driving in grassy areas to avoid stumps, ruts and ditches. Wet conditions will result in unsuitability of wheeled vehicle operations due to miring. | Movement is unrestricted during dry periods. Wet periods may produce some boggy soils that would slow movement. |
| 4 | Level to gently sloping areas covered in brush. Areas of slopes ranging from level to approximately 30%, covered in scrub. Canopy closure ranges from 10% to 100%, with a very dense trunk spacing. Vegetation is predominantly juniper with some small isolated stands of mesquite and willow. Soil types are generally clays with some silts and loams in brushy areas adjacent to Area 3. Water table generally relatively low. | Progress slowed considerably due to brush. Choice of movement direction may be limited. Most brush can be easily pushed over by tanks; APCs may have a more difficult time. Visibility is severely restricted, but at the same time, concealment from ground level observation is greatly enhanced. Concealment from aerial observation is not afforded to tracked vehicles in this area. | Movement through brushy areas difficult to unsuited. For wheeled vehicles, a pick and choose situation for movement exists. Localized movement is possible, but generally the density of brush precludes movement. | Movement slightly restricted due to thickness of brush in the area. Direction of movement may not be of absolute free choice, but dictated by openings in the scrub. |
| 5 | Predominantly level areas covered in juniper forest. Areas of slopes ranging from level to 15%. Unit generally occurs along top of mesa-like hills or along streams. Trees average 4.5 meters to 6 meters in height with trunk circumferences of .4 meter (5 inch diameter). Tree spacing is usually greater than 3 meters. The water table is usually quite low at the higher elevations. | Movement of tracked vehicles through these areas is severely hindered. Spacing of trees may allow selective movement by APC, but choice of direction is limited. Tanks may be able to push over trees in less dense areas, but denser areas may prove to restrict movement. Low hanging branches severely restrict visibility in these areas. | The density of trees in stands in this area precludes all but localized movement of vehicles in these areas. Some trails may exist that may allow some directional movement, but off of these trails, movement is hindered. | Movement among trees unrestricted in most areas. Some low hanging branches may influence choice of direction. Good concealment offered in these areas. |
| 6 | Lightly forested areas. Forested areas composed of mixed deciduous and coniferous trees mixed equally. Species include juniper, oak, and willow. Tree circumferences average one meter (12 inch diameter) for the deciduous trees and 0.4 meter (5 inch diameter) for coniferous trees. Deciduous tree spacing varies but averages greater than 3 meters, with isolated stands having a much closer spacing. Coniferous trees may be spaced as close as 1 meter. Stands are normally found at higher elevations, particularly atop the mesa-like ridges. | Direction of movement limited for tracked vehicles. Size of deciduous trees may preclude tanks from pushing them over. APCs have more freedom of choice for movement due to tree spacing. Visibility severely restricted due to low branches of vegetation. Deciduous trees offer fair concealment from observation April through November. | Choice of direction of movement for wheeled vehicles is limited. Tree spacing will dictate direction of movement. In some areas, movement will be prohibited because of low branches and underbrush. | Movement among trees unrestricted. Concealment fair in these areas. Size of trees offers good cover possibilities. |
| 7 | Densely forested areas. Deciduous forest consisting of mainly live oak and Spanish oak. Trunk circumferences average 1.1 meter (13 inch diameter). Spacing of trees range from 2 meters to 3.5 meters. Locations of stands are mainly in northern part of post and along well-established streams. Solls in the area are mainly silts and loams. The water table is generally high. | Precludes all but localized movement in any direction. APCs may be able to pick and choose through some areas depending on local reconnaissance. Tree spacing generally precludes tank movement in these areas. | Because of the closely spaced trees in these areas, movements other than on trails are precluded. | Movement among trees unrestricted in most areas. Some areas of underbrush may influence direction of movement. Good cover and concealment offered. |
| 8 | Hillocks, cliffs, and stream banks with steep slopes. Hillocks and mesa-like ridges including sideslopes, escarpments, and stream banks with steep slopes. Most slopes exceed 35%. Ground surface generally is very rough and stony. Soils on hillocks, ridges, and stream banks are generally clays that become very slicle during wet periods. Loose stones on ground surface seriously reduce traction on slopes. In some areas the hillocks and ridges are covered with scrub that further hinders movement. | Generally, conditions preclude all but localized movement. Combinations of slopes and brush, or slopes and soil conditions, severely hinder movement. High performance characteristics of an APC may enable that vehicle to move in selected spots. Tanks are generally precluded from movement. Wet periods produce slick clay soils that reduce traction and further hinder movement. | Movement is generally precluded during dry periods, though local reconnaissance may reveal some available avenues. During wet periods, movement is precluded. | Movement up steeper slopes causes slower movements. Some cliffs so steep as to preclude movement except climbing. Wet periods increase the hazard on steeper slopes. |

CROSS-COUNTRY MOVEMENT (Continued)

- * Comments apply to the M-60 tank and the M-113 armored personnel carrier (APC).
- ** Comments apply to the M-35 $2\frac{1}{2}$ ton truck and the M-151 $\frac{1}{4}$ ton truck.
- Explanation of wet and dry periods:

Dry Period: The period when soil moisture is relatively low and the water table has been lowered. In most years this period extends from mid-May through August, and late November through January. Unusual climatic variations may drasti-

cally alter this time period.

Wet Period: The period when soil moisture is relatively high and the water table is raised. In most years this period extends from about February to mid-May and from September to November. Wet periods of short duration may occur at other times of the year. It should be noted that severe thunderstorms occur during the wet period, particularly in the springtime. These storms often result in flash-flooding throughout the reservation, and any watercourse and its associated flood plain should be considered extremely hazardous during and after the storm.

CROSS - COUNTRY MOVEMENT

The map deals with cross-country movement, (that is, movement away from roads), and is intended primarily for use in planning operations. Ground reconnaissance is required to determine exact driving routes. Many areas of small aerial content, such as small depressions, small forested tracts, or ditches, may be too small to portray at the map scale. Terrain factors that may affect movement are generalized to suit the map scale.

The predicted movement ratings are those that usually prevail in most years. Seasonal variations as well as short-term climatic variations may cause deviations from these ratings. Year to year variations may also occur. The ratings are applicable to present terrain conditions and do not take into consideration future alterations such as road clearing, building, or other clearing operations, or drainage alter-

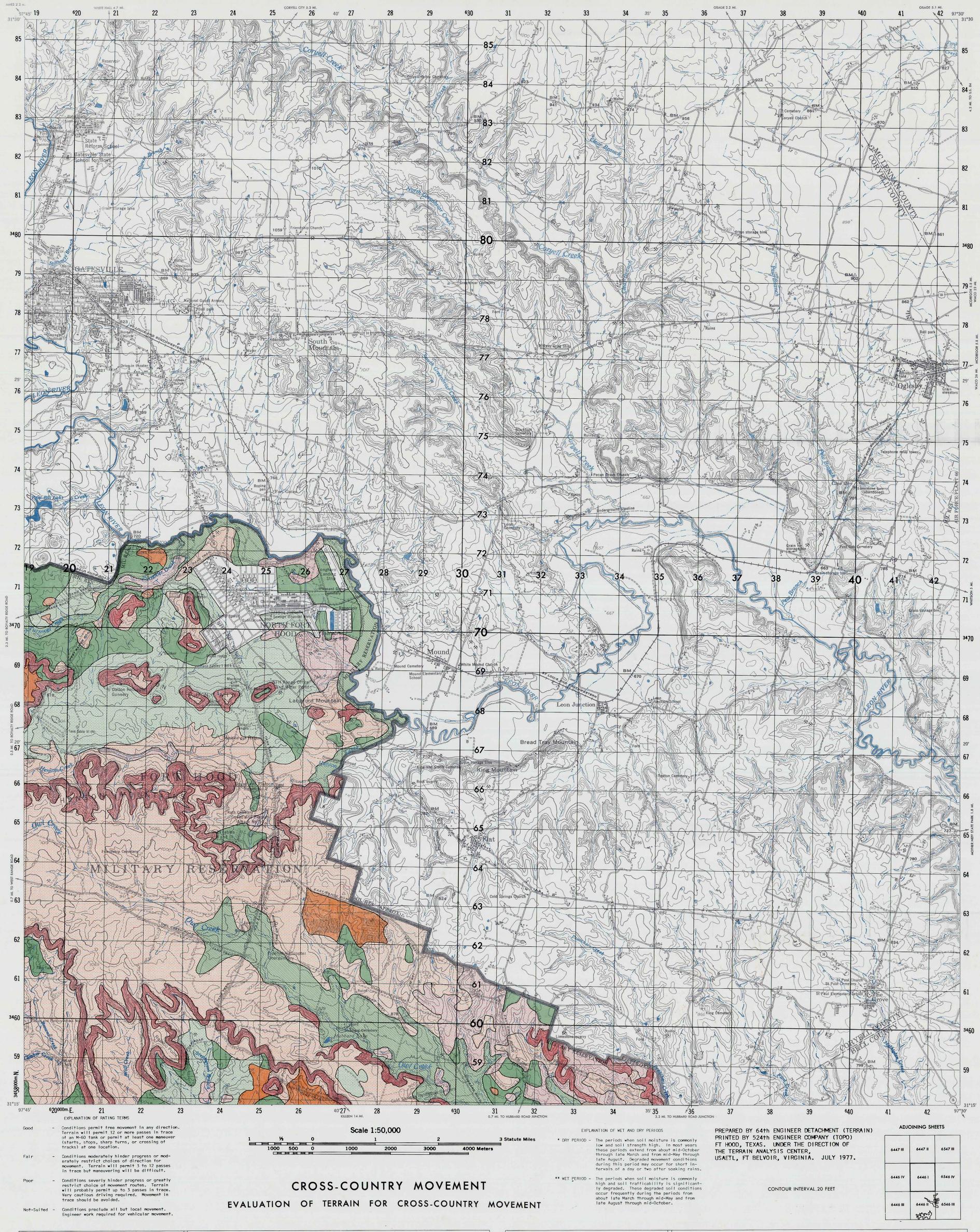
EXPLANATION OF RATING TERMS

| GOOD - | Generally, conditions permit free movement in any direction; locally, some restrictions may present themselves. Terrain generally will permit 12 and the second and the sec |
|--------|--|
| | mit 12 or more passes in trace of an M-60 tank, or permit at least one maneuver (starts, stops, sharp turns, or crossing of tracks) at one location. |

Generally, conditions moderately hinder progress or moderately re-FAIR strict choice of direction for movement; local conditions may be more or less restrictive. Terrain will permit 3 to 12 passes in trace of an M-60, but maneuvering will be difficult.

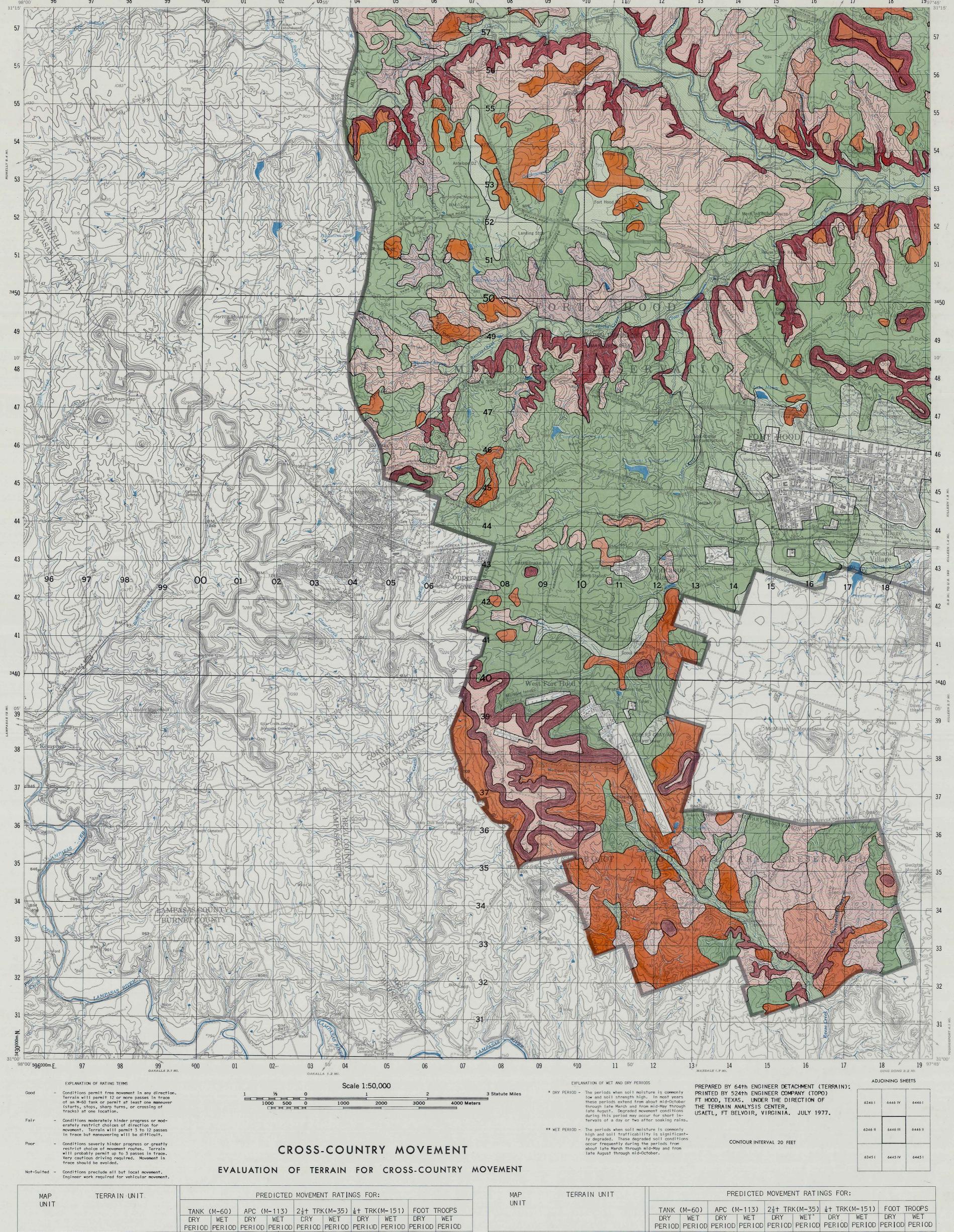
POOR -Generally, conditions severely hinder progress or greatly restrict choice of movement routes. Terrain will probably permit up to 3 passes in trace of an M-60 tank, but local conditions may be more restrictive. Very cautious driving is required. Movement in trace should be avoided.

UNSUITED - Conditions preclude all but local movement. Engineer work is required for vehicular movement.



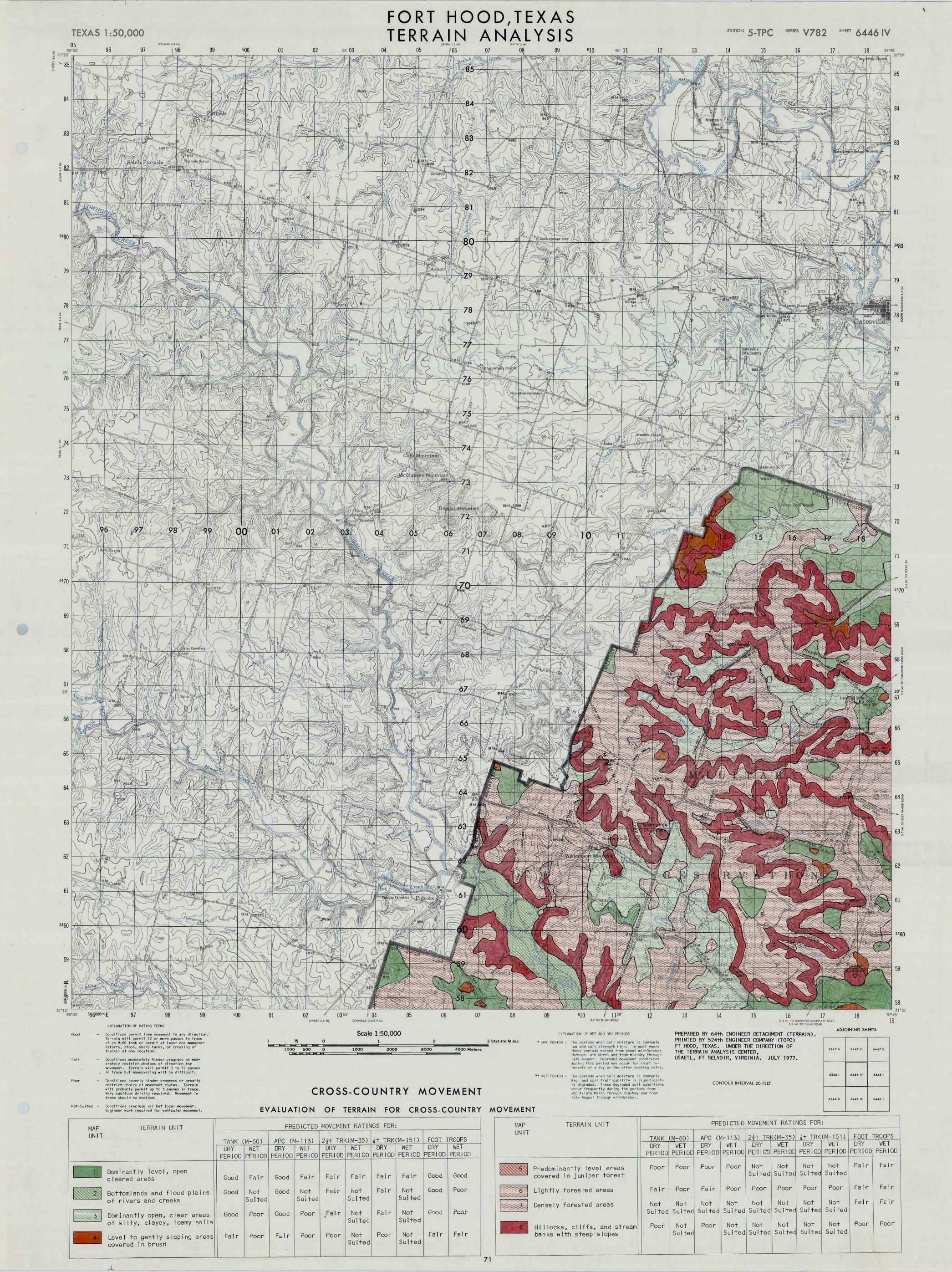
| MAP | TERRAIN UNIT | | | PRE | PREDICTED MOVEMENT RATINGS FOR: | | | | | | | | | | | |
|------|--|---------------|------------------------|---------------|---------------------------------|---------|------------------------|---------|------------------------|---------------|-----------------|--|--|--|--|--|
| UNIT | | TANK (| M-60) | APC (N | 1-113) | 2분+ TRK | ((M-35) | ±+ TRK(| (M-151) | FOOT T | TROOPS | | | | | |
| | | DRY PERIOD | WET | DRY PERIOD | WET | DRY | WET | DRY | WET PERIOD | DRY PERIOD | WET PER I OE | | | | | |
| 1 | Dominantly level, open cleared areas | Good | Fair | Good | Fair• | Fair | Fair | Fair | Fair | Good | Good | | | | | |
| 2 | Bottomlands and flood plains of rivers and creeks | Good | Not Su i ted | Good | Not Suited | Fair | Not Su i ted | Fair | Not Suited | Good | Poor | | | | | |
| 3 | Dominantly open, clear areas of silty, clayey, loamy soils | Good | Poor | Good | Poor | Fair | Not Suited | Fair | Not Su i ted | Good | Poor | | | | | |
| 4 | Level to gently sloping areas covered in brush | Fair | Poor | Fair | Poor | Poor | Not Suited | Poor | Not Suited | Fair | Fair | | | | | |

| MAP | TERRAIN UNIT | PREDICTED MOVEMENT RATINGS FOR: | | | | | | | | | | | |
|------|--|---------------------------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|--|--|
| UNIT | | TANK | (M-60) | APC (N | 1–113) | 2½+ TR | ((M-35) | ‡+ TRK | (M-151) | FOOT | TROOPS | | |
| | | DRY PER I O D | WET PERIOD | DRY PERIOD | WET PER LOD | DRY PERIOD | WET PERIOD | DRY PERIOD | WET PERIOD | DRY PER!OD | WET PERIOD | | |
| 5 | Predominantly level areas covered in juniper forest | Poor | Poor | Poor | Poor | Not Suited | Not Suited | Not Suited | Not Suited | Fair | Fair | | |
| 6 | Lightly forested areas | Fair | Poor | Fair | Poor | Poor | P∞r | Poor | Poor | Fair | Fair | | |
| 7 | Densely forested areas | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Fair | Fair | | |
| 8 | Hillocks, cliffs, and stream banks with steep slopes | Poor | Not Suited | Poor | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Poor | Poor | | |



| | engineer work required for venicular movement. | | | | | | | | | | |
|------|--|--------|------------------------|--------|---------------|---------------|-------------------------|---------------|------------------------|-------------|-------|
| MAP | TERRAIN UNIT | | | PRE | DICTED | MOVEMEN | IT RATIN | NGS FOR | | | |
| UNIT | | TANK (| TANK (M-60) | | 1-113) | 2½+ TRK(M-35) | | 4+ TRK(M-151) | | FOOT TROOPS | |
| | | DRY | WET | DRY | WET | CRY | WET | DRY | WET | DRY | WET |
| | | PERIOD | PERIOD | PERIOD | PERIOD | PERIOD | PERIOD | PERTUD | PERIOD | PERIOD | PERIO |
| 1 | Dominantly level, open cleared areas | G∞d | Fair | Good | Fair | Fair | Fair | Fair | Fair | Good | Good |
| 2 | Bottomlands and flood plains of rivers and creeks | Good | Not Su i ted | Good | Not Suited | Fair | .Not Su i ted | Fair | Not Su i ted | Good | Poor |
| 3 | Dominantly open, clear areas of silty, clayey, loamy soils | Good | Poor | Good | Poor | Fair | Not Suited | Fair | Not Su i ted | Good | Poor |
| 4 | Level to gently sloping areas covered in brush | Fair | Poor | Fair | Poor | Poor | Not Suited | Poor | Not Suited | Fair | Fair |

| MAP | TERRAIN UNIT | PREDICTED MOVEMENT RATINGS FOR: | | | | | | | | | | | |
|--|--|---------------------------------|---------------|---------------|----------------|---------------|----------------|---------------|---------------|---------------|---------------|--|--|
| UNIT | | TANK | (M-60) | APC (N | 1–113) | 2½+ TR | ((M-35) | ‡+ TRK | (M-151) | FOOT | TROOPS | | |
| | | DRY PERIOD | WET PERIOD | DRY PERIOD | WET PERIOD | DRY PERIOD | WET* PERIOD | DRY PERIOD | WET PERIOD | DRY PER!OD | WET PERIOD | | |
| | Predominantly level areas covered in juniper forest | Poor | Poor | Poor | Poor | Not Suited | Not Suited | Not Suited | Not Suited | Fair | Fair | | |
| 6 | Lightly forested areas | Fair | Poor | Fair | Poor | Poor | Poor | Poor. | Poor | Fair | Fair | | |
| 7 | Densely forested areas | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Fair | Fair | | |
| AND DESCRIPTION OF THE PARTY OF | Hillocks, cliffs, and stream banks with steep slopes | Poor | Not Suited | Poor | Not Suited | Not Suited | Not Suited | Not Suited | Not Suited | Poor | Poor | | |
| | | | | | | | | | | | - | | |



J. LINES OF COMMUNICATION

1. ROADS

The extensive road network of Fort Hood is composed of roads and vehicle trails of various constructions. The total length of these is 3170 km (1970 mi). The network is composed of primary roads (all hard surface), secondary roads (improved dirt), unimproved dirt roads, tank trails, and vehicle

The primary roads are paved with hot-mix asphaltic concrete and are termed herein bituminous. The secondary roads are constructed generally of stabilized soil, are maintained on a regular schedule, and are labeled improved dirt (stabilized soil). The secondary roads have some segments in their total length which are paved.

Roads that are characteristically poorly or inadequately drained and are infrequently maintained are herein denoted unimproved dirt roads. Tank trails exist generally parallel to primary and secondary roads, are somewhat drained, and are

sufficiently wide to permit two tanks to pass. The tank trails function to provide off-road, rapid passage of tracked vehicles from the cantonment area to the various training areas.

Finally, throughout the reservation there exists an indeterminate number of vehicle trails. These trails are continuously created by maneuver units utilizing the training areas. The trafficability of these trails decreases drastically in wet weather, particularly in low areas.

| ROUTE NUMBER OR NAME | GRID REFERENCE From - To | LENGTH OF SEGMENT | MILITARY LOAD CLASSIFICATION | ROUTE TYPE | S CONSTRUCTION MATERIALS | SURFACE WIDTH/ CONDITION | SHOW CONSTRUCTION MATERIALS | JLDER WIDTH/ CONDITION | REMARKS |
|------------------------------|--|--|------------------------------------|---------------------|--------------------------------|--------------------------|-----------------------------------|------------------------------|---|
| TX 36 | PK23497265 - PK27556700 | 7.03 km (4.37 mi) | | all weather | bituminous | 6.9 m (22.6 ft) good | bituminous | 2.0 m (6.6 ft) good | |
| US 190 (Business) | PK07644333 - PK19864348 | 12.29 km (7.64 mi) | | all weather | bituminous | 7.9 m (26.0 ft) good | bituminous | 2.3 m (7.5 ft) good | Road is four-lane, undivided. |
| US 190 | PK17274360 - PK19174229 | 6.66 km (4.14 mi) | | all weather | bituminous | 8.2 m (27.0 ft) good | bituminous | 2.7 m (9.0 ft) good | Road is four-lane, divided with turf median. |
| Base Road | PK10843874 - PK10914347 | 6.85 km (4.26 mi) | | all weather | bituminous | 9.3 m (30.6 ft) good | stabilized soil | 2.9 m (9.5 ft) good | |
| Battalion Avenue | PK14064609 - PK21404542 | 7.43 km (4.62 mi) | | all weather | bituminous | 7.9 m (26.0 ft) good | no shoulder | | |
| Central Avenue | PK14134639 - PK19624568 | 5.53 km (3.44 mi) | | all weather | bituminous | 7.9 m (26.0 ft) good | no shoulder | | |
| Clear Creek Road | PK14824865 - PK14664319 | 5.95 km (3.70 mi) | | all weather | bituminous | 7.4 m (24.2 ft) good | stabilized soil | 3.1 m (10.3 ft) good | |
| Copperas Cove Road | PK06094486 - PK15644485 | 10.20 km (6.34 mi) | | all weather | bituminous | 7.0 m (23.0 ft) good | stabilized soil | 2.1 m (7.0 ft) good | |
| East Range Road | PK22567119 - PK21694625 | 36.91 km (22.94 ml) | | all weather | bituminous | 6.6 m (21.8 ft) good | stabilized soil | 2.7 m (9.0 ft) good | |
| Segment 1 | PK22567119 - PK25346483 | 7.42 km (4.61 mi) 13.05 km (8.11 mi) | | all weather | bituminous | 6.6 m (21.8 ft) good | stabilized soil | 2.7 m (9.0 ft) good | |
| Segment 2 | PK29895288 - PK21694625 PK25346483 - PK29895288 | 16.44 km (10.22 mi) | | all weather | stabilized soil | | stabilized soil | | |
| Hood Road | PK17264373 - PK17794626 | 2.67 km (1.66 mi) | | ali weather | bituminous | 11.1 m (36.3 ft) good | no shoulder | | |
| North No lan Roa d | PK22934750 - PK39454371 | 18.58 km (11.55 mi) | | all weather | bituminous | 7.1 m (23.2 ft) good | stabilized soil | 1.8 m (5.9 ft) good | |
| Old Georgetown Road | PK21567100 - PK05954481 | 34.34 km (21.34 mi) | | ali weather | bituminous | 7.3 m (24.0 ft) good | stabilized soil | 2.4 m (8.0 ft) good | |
| South Range Road | PK15654800 - PK21704625 | 7.34 km (4.56 mi) | | all weather | bîtuminous | 7.6 m (25.0 ft) good | stabilized soil | 2.9 m (9.5 ft) good | |
| Turkey Run Road | PK06904784 - PK15824660 | 9.77 km (6.07 mi) | | a ll weather | bituminous | 6.7 m (21.9 ft) good | stabilized soil | 3.2 m (10.5 ft) good | |
| West Range Road | PK23857190 - PK15954663 | 31.83 km (19.78 mi) | | all weather | bituminous | 7.6 m (24.9 ft) good | stabilized soil | 2.9 m (9.5 ft) good | 4 lane divided between PK13475041 to PK15954663, segment is 4.88 km (3.03 mi) in length, lanes are 6.7 m (21.9 ft) wide with a 2.7 m (9 ft) shoulder. |
| Total Hard Surfaced Roads | | 186.94 km (116.19 mi |) | all weather | stabilized : | soi I | stabilized soil | | WITH a z. 7 m (5 17) Shout sort |
| Improved Dirt Roads | | 193.44 km (120.22 mi |) | dry weather | soi l | | no shoulder | | |
| Unimproved Dirt Roads | | 111 km (69 mi) | | dry weather | soil | | no shoulder | | Some short segments have insufficient drainage. |
| Tank Trails | | 265 km (165 mi) | | dry weather | soi I | | no shoulder | | Trafficability for wheeled vehicles decreases significantly in wet weather. |
| Vehicle Trails | | 2400 km (1492 mi) | | | | | | | Some segments are untrafficable to other than combat vehicles, particularly in wet weather. |

ROAD BRIDGES

| BRIDGE NUMBER | ROUTE DESIGNATION | GRID REFERENCE | FEATURE CROSSED | MILITARY LOAD CLASSIFICATION ² | DIMENSIONS | CLEARANCE ¹ | TYPE/CONSTRUCTION MATERIAL | CONDITION | REMARKS |
|---------------|---------------------|----------------|----------------------------|--|---|------------------------|---|-----------|--|
| 1 | Old Georgetown Road | PK10655753 | Cowhouse Creek | one way: 22 W 23 T | structure length: 85.04 m (279 ft) maximum span length: 27.28 m (89 ft 6 in.) roadway width: 3.66 m (12 ft) | unlimited vertical | Five-span bridge Through-truss structural steel. Metal decking. Bituminous wearing surface. | Fair | Piers and abutments are reinforced concrete on spread footings. |
| 2 | Old Georgetown Road | PK09755544 | Cottonwood Creek | one way: 80 W 70 T two way: 30 W 30 T | structure length: 32.31 m (106 ft) maximum span length: 4.65 m (15 ft 3 in.) roadway width: 6.71 m (22 ft) | unlimited vertical | Seven-span bridge. Simple span timber trestle. Timber decking. Bituminous wearing surface. | Fair | Timber bents with timber caps and sills are on concrete footings. |
| 3 | West Range Road | PK14865384 | Cowhouse Creek | one way: 135 W 120 T two way: 60 W 60 T | structure length: 85.34 m (280 ft) maximum span length: 22.86 m (75 ft) roadway width: 7.92 m (26 ft) | unlimited vertical | Four-span bridge. Continuous span structural steel. Concrete deck. Bituminous wearing surface. | Good | Piers are reinforced concrete on spread footings. Abutments are reinforced concrete on steel piling. |
| 4 | West Range Road | PK13425062 | House Creek | one way: 150 W 135 T two way: 30 W 30 T | structure length: 59.79 m (196 ft 2 in.) maximum span length: 18.33 m (60 ft 1.75 in.) roadway width: 5.49 m (18 ft) | unlimited vertical | Seven-span bridge. Continuous and simple span structural steel. Concrete deck. No wearing surface. | Fair | Piers and abutments are reinforced concrete on spread footings. |
| 5 | South Range Road | PK19804671 | Bull Run Creek | one way: 70 W 50 T two way: 30 W 30 T | structure length: 18.44 m (60 ft 6 in.) maximum span length: 4.72 m (15 ft 6 in.) roadway width: 7.32 m (24 ft) | unlimited vertical | Four-span bridge. Simple span timber trestle. Metal decking. Bituminous wearing surface. | Fair | Timber bents with timber caps and sills are on concrete footings. |
| 6 | Maxdale Road | PK14413368 | Reeses Creek | one way: 30 W 30 T two way: 24 W 24 T | structure length: 18.36 m (60 ft 3 in.) maximum span length: same as structure length roadway width: 5.69 m (18 ft 8 in.) | unlimited vertical | One-span bridge. Simple span structural steel. Reinforced concrete deck. No wearing surface. | Good | The abutments are reinforced concrete on spread footings. |
| 7 | Pump Station Road | PK11494096 | Clear Creek (tributary) | one way: 39 W 21 T | structure length: 27.91 m (91 ft 7 in.) maximum span length: 5.23 m (17 ft 2 in.) roadway width: 3.45 m (11 ft 4 in.) | unlimited vertical | Seven-span bridge. Simple span timber trestie. Timber decking. No wearing surface. | Fair | Timber bents with timber caps and sills and concrete piers are on concrete footings. |
| 8 | East Range Road . | PK30945731 | Owl Creek | one way: 100 W 90 T two way: 30 W 30 T | structure length: 27.74 m (91 ft) maximum span tength: 18.59 m (61 ft) roadway width: 5.49 m (18 ft) | unlimited vertical | Two-span bridge. Simple span structural steel. Reinforced concrete deck. No wearing surface. | Fair | Piers and abutments are reinforced concrete on spread footings. |
| 9 | East Range Road | PK29735280 | Cowhouse Creek | one way: 120 W 100 T two way: 100 W 100 T | structure length: 490.73 m (1610 ft) maximum span length: 21.34 m (70 ft) roadway width: 8.53 m (28 ft) | unlimited vertical | Twenty-three span bridge. Simple span prestressed concrete. Reinforced concrete deck. No wearing surface. | Excellent | Piers and abutments are reinforced concrete on drilled and belied piers. |

NOTE: 1. The horizontal clearance on all of the bridges is equal to the roadway width.

2. W - wheeled vehicle
T - tracked vehicle

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Fort Hood is located astride the Atchison Topeka and Santa Fe Railroad's east-west line from Temple, TX to San Angelo, TX. The A.T. & S.F. Railroad owns and maintains a right-of-way (ROW) 50 feet north and south of the main track center line. A portion of track leading into Fort Hood from each of three turnouts lies in the Santa Fe ROW and is maintained by the railroad company. These turnouts are located (east to west) at PK17164380, PK16384381, and PK15044369.

Fort Hood's rail network can be divided into two parts, east and west, for purposes of discussion. The eastern part is the railhead consisting of four tracks with associated loading ramps. This yard is internally connected by a ladder on the east end and by two cutoffs near the middle. The yard is externally connected

to the A.T. & S.F. main line by a turnout to the east end ladder and to the western part by a track connection which permits traffic between the two parts without interfering with the A.T. & S.F. main line.

The western part consists of a siding with four separate branches, branch A, B, C, & D, extending from it. The siding is connected to the eastern part as mentioned above and is connected to the A.T. & S.F. main line by two turnouts, one at each end. Branch C and D (see map on page 76) includes a network of spurs, cut offs and sidings.

All of the track outside the A.T. & S.F. ROW is maintained by the Directorate of Facilities Engineering. The total length of rail line on the reservation is 27.26 km (16.94 mi). Of this, A.T. & S.F. owns and operates 13.37 km (8.31 mi) and the U.S. Government owns and operates 13.89 km (8.63 mi).

| • | | | - | 5. | F. owns and operates 13.37 km (8.31 | mi) and the U.S | . Government owns | and operates 13.89 km (8.63 mi). |
|----------------|------------------------------|--------------------------|------------------------|--|--|---------------------|----------------------|--|
| IDENTIFICATION | SIDING & SPUR IDENTIFICATION | GRID REFERENCE From - To | LENGTH OF SEGMENT | OWNERSHIP OF LINE/ CONDITION OF TRACK | TRACK CHARACTERISTICS | BALLAST MATERIAL | VOLUME OF TRAFFIC | FACILITIES |
| Santa Fe Main | | PK19864355 - PK07664351 | 12.615 km (7.84 mi) | A.T. & S.F. RR / Excellent | single track; standard gage* rail weight: 115 lb/yd max grade: 1 % west*** min rad / curv: 988 m (3240 ft) | crushed stone | 10,000 m/mo** | |
| | asphalt plant siding | PK14384365 - PK13674384 | 0.75 km (0.47 mi) | A.T. & S.F. RR / Good | single track rail weight: 115 lb/yd max grade: 1 % east | crushed stone | 5 m/mo | |
| Railhead | | PK17134381 - PK15994380 | 4.03 km (2.5 mi) | U.S. Government / Good | four tracks rail veight: 85 lb/yd max grade: 1 % east min rad of curv: 167 m | crushed stone | 300 m/mo | <pre>4 ea concrete side-of-track loading ramps (north track only) 4 ea concrete end-of-track loading ramps</pre> |
| Main Siding | | PK16374382 - PK15044369 | 1.37 km '0.85 mi) | U.S. Government / Good | four tracks rail weight: 85 lb/yd max grade: 1 % east min rad / curv: 167 m (550 ft) | crushed stone | 300 m/mo | |
| | Y-spur to Branch D | PK15334390 - PK15154371 | 0.27 km (0.17 mi) | U.S. Government / Good | single track rail weight: 85 lb/yd max grade: 1 % east min rad / curv: 229 m (750 ft) | crushed stone | 300 m/mo | |
| Branch A | | PK15604379 - PK15584432 | 0.65 km (0.41 mi) | U.S. Government / Good | single track rail weight: 80 lb/yd max grade: 1 % south min rad / curv: 145 m (475 ft) | crushed stone | 150 m/mo | |
| Branch B | | PK15684378 - PK15424445 | 0.83 km (0.52 mi) | U.S. Government / Good | single track rail weight: 80 lb/yd max grade: 1 % south min rad / curv: 167 m (550 ft) | crushed stone | 50 m/mo | |
| Branch C | | PK15544374 - PK15254479 | 1.16 km (0.72 mi) | U.S. Government / Good | three tracks rail weight: 85 lb/yd max grade: 1 % south min rad / curv: 207 m (675 ft) | crushed stone | 150 m/mo | |
| | Bldg 4233 siding | PK15404396 - PK15394412 | 0.17 km (0.11 mi) | U.S. Government / Good | single track rail weight: 85 lb/yd max grade: 1 % south | crushed stone | 150 m/mo | |
| | Bldgs 4237 - 4246 siding | PK15344411 - PK15244474 | 0.64 km (0.39 mi) | U.S. Government / Good | single track rail weight: 85 lb/yd max grade: 1 % south | crushed stone | 150 m/mo | |
| | Bldgs 4223 - 4231 siding | PK15364412 - PK15264475 | 0.59 km (0.37 mi) | U.S. Government / Good | single track rail weight: 85 lb/yd max grade: 1 % south | crushed stone | 150 m/mo | |
| Branch D | | PK15434374 - PK15134493 | 1.42 km (0.88 mi) | .U.S. Government / Good | three tracks rail weight: 85 lb/yd max grade: 1-% south min rad / curv: 192 m (630 ft) | crushed stone | 300 m/mo | |
| | spur to Bldg 49015 | PK15324384 - PK14994400 | 0.42 km (0.26 mi) | U.S. Government / Good | single track rail weight: 90 lb/yd max grade: 1 % east | crushed stone | 50 m/mo | |
| | old ammunition spur | PK15184465 - PK14634470 | 0.59 km (0.37 mi) | U.S. Government / Good | single track rall weight: 80 lb/yd max grade: 1 % east | crushed stone | 50 m/mo | |
| | Bldgs 4263 - 4264 siding | PK15264403 - PK15254410 | 0.13 km (0.08 mi) | U.S. Government / Good | single track rail weight: 75 lb/yd max grade: 1 % south | crushed stone | 5 m/mo | |
| | Bldgs 4265 - 4272 siding | PK15294405 - PK15164461 | 0.57 km (0.35 mi) | U.S. Government / Good | single track rail weight: 75 lb/yd max grade: 1 % south | crushed stone | 150 m/mo | |
| | Bldgs 4256 - 4260 siding | PK15294419 - PK15244445 | 0.37 km (0.23 mi) | U.S. Government / Good | single track rail weight: 75 lb/yd max grade: 1 % south | crushed stone | 50 m/mo | |
| | Bldgs 4274 - 4275 siding | PK15164470 - PK15134481 | 0.15 km (0.09 mi) | U.S. Government / Good | single track rail weight: 75 lb/yd max grade: 1 % south | crushed stone | 50 m/mo | |
| | Bldgs 4128 - 4254 siding | PK15234451 - PK15154492 | 0.53 km (0.33 mi) | U.S. Government / Good | single track rail weight: 75 lb/yd max grade: 1 % south | crushed stone | 150 m/mo | |

^{*}all railroad tracks are standard gage (41-8½")

**average car movements per month

***maximum grade in direction of travel

RAILROAD BRIDGES

| ID | | | NUMBER | ROADWAY | CLEAR | ANCE | | | | |
|-------|------------|-------------------|------------------------|-------------------|-----------|-----------|-------------------|--|---|--|
| NO | LOCATION | FEATURE CROSSED | OF TRACKS | WIDTH | HORIZ | VERT | DECK MATERIAL | OVERALL LENGTH | TYPE OF STRUCTURE | REMARKS TA SHT OF STATE OF S |
| RR 1 | PK19344360 | South Nolan Creek | ch epd. | 4.27 m (14 f+) | unlimi+ed | unlimited | ballast on timber | 46.94 m (154 ft) | timber pile trestle | A.T. & S.F. structure no. 244.7 |
| RR 2 | PK17294378 | Hood Road | resprivat e U.S. Go | 5.79 m (19 ft) | unlimited | unlimited | ballast on steel | 72.93 m (236 ft) | steel plate girder | A.T. & S.F. structure no. 246.0 |
| RR 3 | PK16284380 | draw | 1 | 3.66 m (12 ft) | unlimited | unlimited | no deck | H W L* 1.52 m x 1.83 m x 10.06 m (5 ft x 6 ft x 33 ft) | reinforced concrete box culvert | A.T. & S.F. structure no. 247.1 |
| RR 4 | PK12734431 | Clear Creek | 1 | 3.96 m (13 ft) | unlimited | unlimited | ballast on timber | 72.24 m (237 ft) | timber pile trestle w/ steel plate girder | A.T. & S.F. structure no. 48.9 stl plt gird, center span: 71 ft |
| | | | | | | | | H W 1* | | |
| RR 5 | PK12154438 | draw | 1 | 3.66 m (12 ft) | unlimited | unlimited | no deck | 1.83 m × 2.44 m × 14.33 m (6 ft × 8 ft × 47 ft) | reinforced concrete box culvert | A.T. & S.F. structure no. 249.3 |
| RR 6 | PK11644423 | Long Branch | 1 | 4.57 m (15 ft) | unlimited | unlimited | ballast on timber | 33.83 m (111 ft) | timber pile trestle | A.T. & S.F. structure no. 249.6 |
| RR 7 | PK11104429 | Long Branch | 1 | 3.96 m (13 ft) | unlimited | unlimited | ballast on timber | 25.60 m (84 ft) | timber pile trestle | A.T. & S.F. structure no. 250.0 |
| RR 8 | PK10454436 | Long Branch | 1 | 3.96 m (13 f+) | unlimited | unlimited | ballast on timber | 25.60 m (84 f+) | timber pile trestle | A.T. & S.F. structure no. 250.4 |
| | | | | | by | at as the | iverament tour if | 4.03 lon U.S. Go | PK17134381 - PK15994380 | handlied |
| RR 9 | PK09524418 | Long Branch | 1 | 4.57 m (15 ft) | unlimited | unlimited | ballast on timber | 29.87 m (98 ft) | timber pile trestle | A.T. & S.F. structure no. 251.0 |
| RR 10 | PK07944356 | Long Branch | 1 enot | 4.27 m (14 ft) | unlimited | unlimited | ballast on timber | 21.34 m (70 f+) | timber pile trestle | A.T. & S.F. structure no. 252.0 |
| | | | | | | | | | | |

RAILROADS (Plan)

*Note: H - height, W - width, L - length



of the second

NAME, GRID REFERENCE, TAXIWAY, PARKING, APRON GEOGRAPHIC ELEVATION ⁴NAVIGATIONAL AND HARDSTAND AREA COORDINATES, AND RUNWAY FACILITIES AIDS REMARKS BUILDING DESCRIPTION DESCRIPTION CLASSIFICATION STATUS DESCRIPTION 1. Deer in vicinity 1. Height of Control 1. Type of Fuel: 1. Taxiway Width: 1 Hangar: 1. Runway (one) of runway. Robert Gray AAF, 1. Elevation: Tower: JP4 $42.4 \times 73.2 \text{ m}$ (139 x 240 ft) a. Parallel Taxi-PK115374, Dimensions: 2. Intense helicopter a. 24.7 m (81 ft) 309.3 m (1015 2. Storage Facilities: 3AF/SB/SS/SR way 22.86 m (75 ft) L-3048 m (10,000 ft) 31º 04' N. Lat. 2. Navigational Aids: operation being conft) a. 2 each: b. Crossover 1 W-60.96 m (200 ft)ducted in vicinity 97° 50' W. Long. 2. Status: VOR 946,250 | (250, a. 22.86 m (75 ft) 1 Open End Dock: Azimuth: 150°/330° of Fort Hood Res-Army Airfield Operational ADF 000 gal) above ь. $12.2 \times 29.3 \text{ m} (40 \times 96 \text{ ft})$ c. Crossover 2 Runway Weight Bearing c. GCA ervation and 100 ground tanks for AF/SB/SS/SR 22.86 m (75 ft) Capacity: nautical mile d. Approach Cona total of 1.89 d. Crossover 3 S 29,510 kg semicircle west trol million l 1 Terminal Building: 22.86 m (75 ft) (65,000 lb) of Fort Hood. 3. Lighting: (25,000 gal) $14.3 \times 48.2 \text{ m} (47 \times 158 \text{ ft})$ e. Crossover 4 T 81,720 kg a. Rotating Beacon Some aircraft opb. 3 each: 22.86 m (75 ft) PL/WF/WB/WW (180,000 lb) b. HIRL erate in the above 94,625 1 (25, 2. Taxiway Load Cap-ST 79,450 kg area are painted to c. SALS 000 gal) under-(179,000 lb) acity blend with terrain ground tanks a. Taxiway load TT 127,120 kg and have no confor a total capacity same (280,000 lb) spicuous markings. of 283,875 1 as runway. TDT 326,880 kg (75,000 gal) b. Crossover (720,000 lb) 3. Type of Oils: load capacity Surface Material: a. 1100, recipsame as run-(AC) rocating engine Condition: oil Taxiway sur-3. a. Excellent b. synthetic face Material: base, turbine engine oil b. Crossover surc. synthetic face Material: base, turboprop and turbo-4. Total Area shaft engines a. North Parking Apron 58203 m² $(626,500.0 \text{ ft}^2)$ b. South Parking Apron 85006 m² $(915,000.0 \text{ ft}^2)$ 5. Load Capacity a. North parking apron same as runway. b. South parking apron same as runway. 6. Surface Material a. North parking apron: PCC b. South paking apron: AC Condition: Excellent 1. Airfield closed to 1. Type of Fuel: 1. Height of Control 1. Taxiway Width: 4 Hangars: 1. Longest Runway: Hood AAF 1. Elevation: fixed wing aircraft JP4 Tower: 13.4 m (44 ft) $39.6 \times 48.8 \text{ m} (130 \times 160 \text{ ft})$ 1,436 m (4,712 ft) until further notice. 281.3 m (923 PK225456 2. Storage Facilities: 18.3 m (60 ft) $39.6 \times 48.8 \text{ m} (130 \times 160 \text{ ft})$ 2. Taxiway Load Capa. Dimensions: 2. NE Taxiway closed ft) 31^o 09¹ N. Lat. 2. Navigation Aids: a. 6 each: $39.9 \times 48.8 \text{ m} (131 \times 160 \text{ ft})$ L-1436.2 m (4,712 ft) acity: 97⁰ 43' W. Long. 2. Status: until further no-37,850 | (10,000 a. VOR $31.7 \times 39.0 \text{ m} (104 \times 128 \text{ ft})$ W-45.7 m (150_ft) Same as runway Operational tice - Taxiway will Army Airfield gal) underground b. NDB CF/SB/SS b. Azimuth: 150°/330° 3. Taxiway Surface be utilized for tanks for a total c. GCA Material: c. Runway Weight Bearing helicopter parking. 3. Lighting: of 227,100 1 H (ASP) 7 Maintenance Facilities: 3. Obstructions in Capacity: a. Rotating Light (60,000 gal) 4. Total Area: $49.1 \times 79.3 \text{ m} (161 \times 260 \text{ ft})$ S 14,982 kg glidepath b. 1 each: (Beacon) $24.4 \times 50.3 \text{ m} (80 \times 165 \text{ ft})$ (includes ap-(33,000 lb) a. lighted obb. High Intensity 45,420 1 (12,000 rons & park- $12.2 \times 30.5 \text{ m} (40 \times 100 \text{ ft})$ T 37,228 kg struction, Ht gal) truck for Runway Lights $11.9 \times 34.2 \text{ m} (39 \times 112 \text{ ft})$ ing areas) (82,000 lb) 69.8 m (229 ft) c. High Intensity dispensing $12.2 \times 26.8 \text{ m} (40 \times 88 \text{ ft})$ 100,775 m² ST 47,216 kg b. lighted ob-Type of Oils: Approach Lights (1,084,770 ft²) $7.3 \times 14.6 \text{ m} (24 \times 48 \text{ ft})$ (104,000 lb) struction, Ht d. Illuminated a. 1065, recipd. Surface Material: 5. Load Capacity: $6.4 \times 14.6 \text{ m} (21 \times 48 \text{ ft})$ 344.7 m (1131 ft) Hover Lanes rocating engine oil Same as runway CF/SB/SS H (ASP) e. Airfield Secb. 1100, recip-6. Surface Material Condition: urity/Boundary a. Parking area: rocating engine oil Excellent 1 Control Tower Building: c. synthetic base, Lighting H(ASP) with $5.8 \times 4.8 \text{ m} (19 \times 19 \text{ ft})$ turboprop and turboa few concrete PL/WF/WW shaft engines helicopter pads 1 Crash Rescue Facility: b. Apron: H(ASP) c. Hardstand: H $10.1 \times 13.1 \text{ m} (34 \times 43 \text{ ft})$ (ASP) PL/WF/WW 7. Condition: 8 Administration Buildings: Excellent $12.2 \times 30.5 \text{ m} (40 \times 100 \text{ ft})$ $12.2 \times 30.5 \text{ m} (40 \times 100 \text{ ft})$ $12.2 \times 30.5 \text{ m} (40 \times 100 \text{ ft})$ $12.2 \times 30.5 \text{ m} (40 \times 100 \text{ ft})$ $12.2 \times 30.5 \text{ m} (40 \times 100 \text{ ft})$

 $15.5 \times 27.7 \text{ m } (51 \times 91 \text{ ft})$ $10.1 \times 24.1 \text{ m} (33 \times 79 \text{ ft})$ $9.8 \times 22.9 \text{ m} (32 \times 75 \text{ ft})$

CF/SS or MW

- NOTES: 1. Runway weight bearing capacity:
 - S Single-wheel type landing gear (C-47,F-100)
 - T Twin-wheel type landing gear (C-9A) ST - Single-tandem landing gear (C-130)
 - TT Twin-tandem landing gear (B-52, C-135)
 - TDT Twin delta tandem landing gear (C-5A) Aircraft weight higher than given requires prior permission from aerodrome controlling authority.
 - 2. Runway surface material: AC - Asphaltic concrete PCC - Portland cement concrete H(ASP) - Hard surfaced asphalt

- 3. Building construction material: CP - Concrete pad floor with gravel adjoining
- CF Concrete floor
- AF Asphaltic concrete floor
- PL Pile foundation WF - Wood flooring
- WB Wood beam construction SB - Steel beam construction
- WW Wood walls
- MW Concrete block masonry walls
- SS Galvanized steel siding NW - No walls
- PS Prestressed concrete walls SR - Galvanized steel roofing
- 4. Navigational Aids:
- VOR very high frequency, omnirange ADF - automatic direction finder
- ground-controlled approach NDB - nondirectional beacon
- HIRL high-intensity runway lighting SALS - short approach lighting system.

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3. AIRFIELDS/AIRSTRIPS (Continued)

| MAP NO. | ELEVATION | RUNWAY DESCRIPTION | REMARKS |
|---------------------------------------|-----------------|--|------------------------------------|
| Longhorn PK268717 | 213.4m (700 ft) | 1097 m × 23 m (3600 ft × 75 ft) Azimuth: 153°/333° Surface Material: Asphaltic Concrete | |
| Shorthorn PK262702 | 207.3m (680 ft) | 655 m x 15 m (2150 ft x 50 ft) Azimuth: 152°/332° Surface Material: Asphaltic Concrete | |
| Landing Strip 8 PK091517 | 292.6m (960 ft) | 343 m x 33 m (1125 ft x 110 ft) Azimuth: 20°/200° Surface Material: Dirt | Crossed by many vehicle trails |
| Landing Strip 12 PK103536 | 289.6m (950 ft) | 1085 m x 74 m (3560 ft x 244 ft) Azimuth: 1 ⁰ /181 ⁰ Surface Material: Turf | Good condition |
| Landing Strip 16 North PK119604 | 280.4m (920 ft) | 457 m x 37 m (1500 ft x 120 ft) Azimuth: 170°/350° Surface Material: Turf | Crossed by numerous vehicle trails |
| Landing Strip 16 South PK119600 | 280.4m (920 ft) | 287 m x 37 m (940 ft x 120 ft) Azimuth: 41º/221º Surface Material: Turf | Crossed by numerous vehicle trails |
| Landing Strip 20 PK182666 | 274.3m (900 ft) | 515 m x 37 m (1690 ft x 120 ft) Azimuth: 178 ⁰ /358 ⁰ Surface Material: Turf | Crossed by numerous vehicle trails |
| Landing Strip 31 PK18343326 | 274.3m (900 ft) | 160 m x 16 m (525 ft x 52 ft) Azimuth: 162 ⁰ /342 ⁰ Surface Material: Dirt | |

4. PIPELINES

| NAME | GRID REFERENCE From - To | STATUS | OWNERSHIP/ MAINTENANCE RESPONSIBILITY | PIPELINE CHARACTERISTICS | TANK CROSSING SITES | REMARKS |
|----------------------|--------------------------|-----------------------|---|--|--|--|
| Crude Oil Pipeline | PK10576759 - PK35295800 | operat i ve | Amdel Pipeline Inc. | Total no. of pipes: one Diameter of pipe: 254 mm (10 in.) Total length of pipeline in study area: 34.71 km (21.57 mi) Material normally carried: crude oil Rated capacity: 1400 gpm Actual throughput: 1300 gpm | PK10606754 PK15356570 PK11526718 PK15866550 PK12186692 PK16096542 PK12806669 PK17916470 PK13356648 *PK18106464 PK14466604 PK18416451 PK19906396 PK29736013 PK21586330 PK30085999 PK22496294 PK30615980 PK23176267 PK31195957 PK24506215 PK31975926 PK25666170 PK32705899 PK26686131 PK33535866 PK27386104 PK34915814 | Average depth of top of pipe from surface: 1.22 m (4 ft) Maximum pressure in pipeline: 1050 psi Origin of pipeline: Port Arthur TX Destination of pipeline: Midland TX Nearest pumping station: Evant TX |
| Natural Gas Pipeline | PK28294374 - PK38914196 | operative | Lone Star Gas Company | Total no. of pipes: two Diameter of pipe: 355.6 mm (14 in.) Total length of pipeline in study area: 6.27 km (3.90 mi) Material normally carried: natural gas Rated capacity: 25,000,000 ft ³ /day Actual throughput: 6,000,000 ft ³ /day | none designated | Lone Star Gas Company No.: L32 Maximum pressure in pipeline: 500 psi Origin of pipeline: Temple TX Destination of pipeline: Killeen TX Nearest control station: Temple TX |
| Aqueduc† | PK19464377 - PK39694439 | under Construction | Killeen **WC1D No. 1 | Total no. of pipes: one Diameters of pipe: 762 mm (30 in.), 1219.2 mm (48 1371.6 mm (54 in.) Total length of pipeline in study area: 23.20 km (14.42 mi) Material normally carried: water Rated capacity: 17,361 gpm Actual throughput: undetermined | none designated | Origin of pipeline: Belton Reservoir Pumping Station Destination of pipeline: Killeen WCID No. 1 Pumping Station |
| *West Range Road | | | | | | |

*West Range Road **Water Control and Improvement District

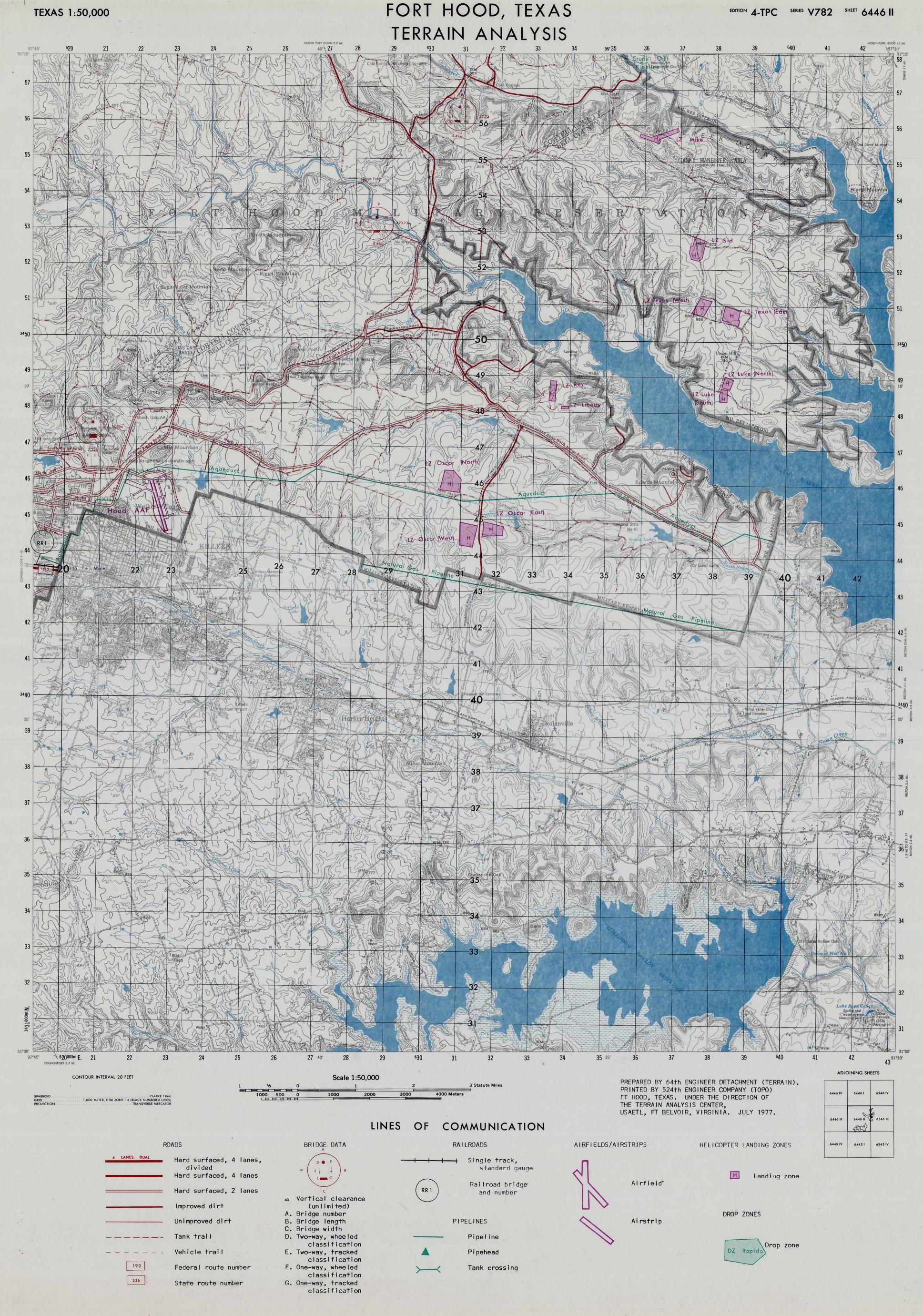
5. HELICOPTER LANDING ZONES

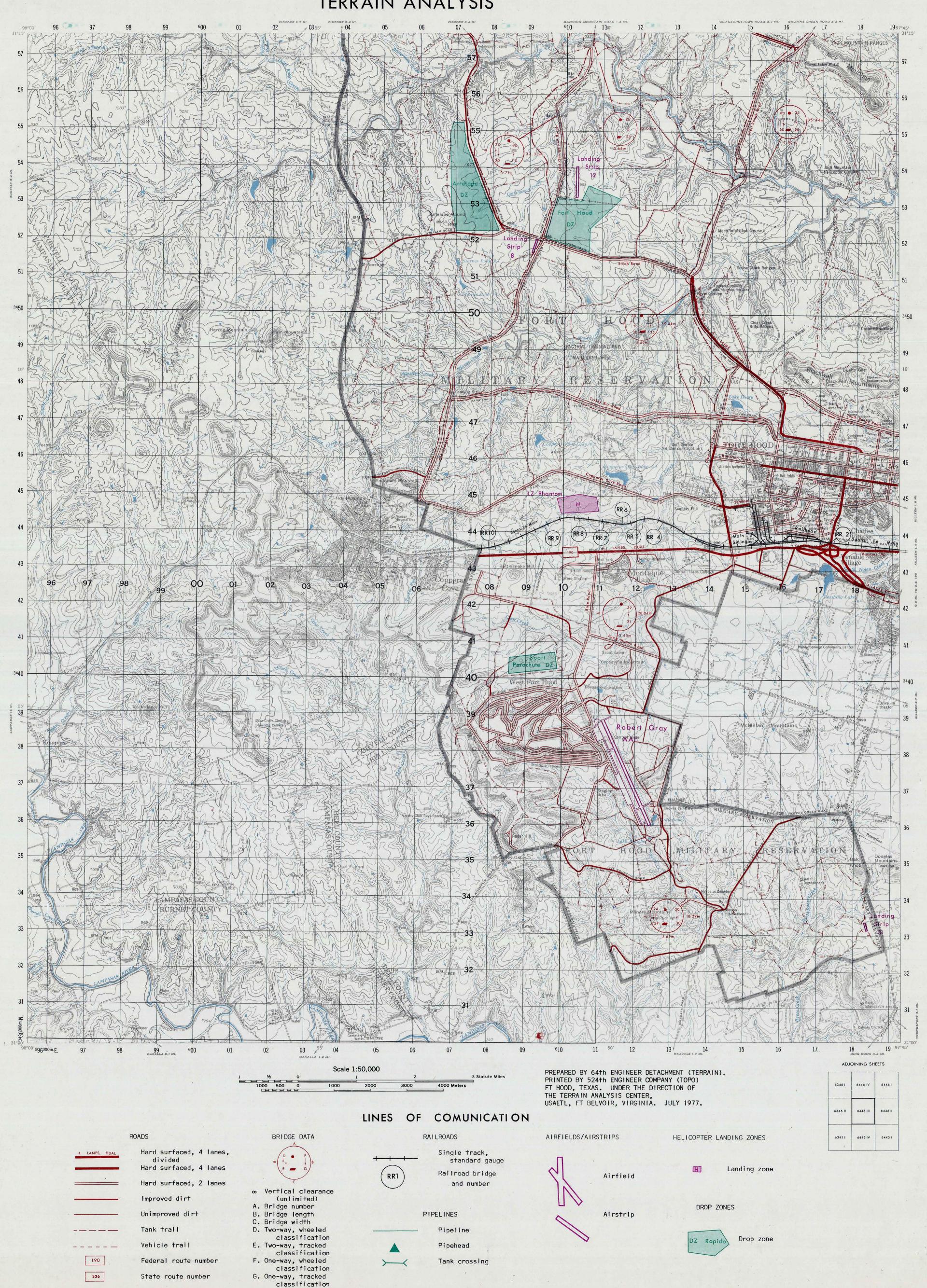
| GRID REFERENCE | DIMENSIONS | AZIMUTH | ELEVATION | SURFACE MATERIAL | RESTRAINTS | REMARKS |
|-------------------|--|---|---|------------------|--|--|
| PK102448 | 868 m × 372 m (2850 ft × 1220 ft) | 85 ⁰ /265 ⁰ | 292.6 m (960 ft) | Grass | None | Perimeter vegetation is grass less than 1 m (3.28 ft) in height. |
| PK309458 | 806 m × 124 m (2640 ft × 400 ft) | 125 ⁰ /305 ⁰ | 277.4 m (910 ft) | Grass | None | Area is crossed by numerous vehicle trails. |
| PK311447 | 496 m × 186 m (1630 ft × 610 ft) | 160 ⁰ /340 ⁰ | 277.4 m (910 ft) | Grass | None | Area is crossed by numerous vehicle trails. |
| PK317449 | 434 m × 186 m (1425 ft × 610 ft) | 1770/3570 | 280.4 m (920 ft) | Grass | None | Area is crossed by numerous vehicle trails. |
| PK335487 | 620 m × 93 m (2035 ft × 305 ft) | 16 º/ 196º | 268.2 m (880 ft) | Grass | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | |
| PK338482 | 279 m × 50 m (915 ft × 160 ft) | 1140/2940 | 256.0 m (840 ft) | Grass | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | |
| PK362557 | 868 m × 93 m (2850 ft × 305 ft) | 1259/3050 | 262.1 m (860 f†) | Dirt | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | |
| PK375527 | 620 m × 310 m (2035 ft × 1017 ft) | 25°/205° | 268.2 m (880 ft) | Grass | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | Area is crossed by numerous vehicle trails. |
| PK384508 | 620 m × 186 m (2035 ft × 610 ft) | 148 [°] /328 [°] | 249.9 m (820 ft) | Grass | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | |
| PK376510 | 558 m × 248 m (1830 ft × 815 ft) | 32°/212° | 253.0 m (830 f†) | Grass | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | |
| PK383490 | 248 m × 155 m (815 ft × 510 ft) | 19 % 199° | 249.9 m (820 f†) | Grass | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | |
| PK382485 | 372 m × 186 m (1220 ft × 610 ft) | 20 9/200 0 | 243.8 m (800 ft) | Grass | Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. | |
| | PK102448 PK309458 PK311447 PK317449 PK335487 PK338482 PK362557 PK375527 PK376510 PK383490 | PK102448 868 m × 372 m (2850 ft × 1220 ft) PK309458 806 m × 124 m (2640 ft × 400 ft) PK311447 496 m × 186 m (1630 ft × 610 ft) PK317449 434 m × 186 m (1425 ft × 610 ft) PK335487 620 m × 93 m (2035 ft × 305 ft) PK338482 279 m × 50 m (915 ft × 160 ft) PK362557 868 m × 93 m (2850 ft × 305 ft) PK375527 620 m × 310 m (2035 ft × 1017 ft) PK376510 558 m × 248 m (1830 ft × 815 ft) PK383490 248 m × 155 m (815 ft × 510 ft) PK382485 372 m × 186 m | PK102448 868 m × 372 m 85°/265° PK309458 806 m × 124 m 125°/305° (2640 ft × 400 ft) PK311447 496 m × 186 m 160°/340° PK317449 434 m × 186 m 177°/357° (1425 ft × 610 ft) PK335487 620 m × 93 m 16°/196° (2035 ft × 305 ft) PK338482 279 m × 50 m 114°/294° (915 ft × 160 ft) PK362557 868 m × 93 m 125°/305° (2850 ft × 305 ft) PK375527 620 m × 310 m 25°/205° (2035 ft × 1017 ft) PK384508 620 m × 186 m 25°/205° (2035 ft × 610 ft) PK376510 558 m × 248 m 32°/212° (1830 ft × 815 ft) PK383490 248 m × 155 m 19°/199° (815 ft × 510 ft) PK382485 372 m × 186 m 20°/200° | PK102448 | PK102448 | PK102448 868 m x 372 m (2850 ft x 1220 ft) 859/2650 292.6 m (960 ft) Grass None PK309458 806 m x 124 m (2640 ft x 400 ft) 1259/3050 277.4 m (910 ft) Grass None PK311447 496 m x 186 m (1600/3400 1600/3400 277.4 m (910 ft) Grass None PK317449 434 m x 186 m (1425 ft x 610 ft) 1600/3500 277.4 m (910 ft) Grass None PK339487 620 m x 93 m (1425 ft x 610 ft) 160/1960 268.2 m (980 ft) Grass Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. PK339482 279 m x 50 m (915 ft x 160 ft) 1140/2940 256.0 m (840 ft) Grass Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. PK362557 868 m x 93 m (2850 ft x 305 ft) 1259/3050 262.1 m (800 ft) Dirt Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. PK375527 620 m x 310 m (2055 ft x 1017 ft) 259/2050 268.2 m (800 ft) Grass Perimeter is mixed forest in excess of 4.5 m (14.76 ft) in height. PK384508 620 m x 186 m (2055 ft x 610 ft) 1489/3280 249.9 m (800 ft) Grass Perimeter is mixed fo |

6. DROP ZONES

| NAME | GRID REFERENCE | DIMENSIONS | AZIMUTH | ELEVATION | SURFACE DESCRIPTION | AIRCRAFT OBSTRUCTIONS | REMARKS |
|--------------------|-------------------|--|-------------------|----------------------|--|-----------------------|--|
| Sport Parachute DZ | PK094406 | 1360 m × 710 m (4460 ft × 2330 ft) | 57°/23 7 ° | 315.5 m (1035 ft) | Surface is gently rolling (2% - 3% max slope). Vegetation is grass less than 1 m in height. | None | Two vehicle trails cross this area. |
| Antelope DZ | PK072536 | 3000 m × 800 m (9840, ft × 2620 ft) | 157°/337° | 298.7 m (980 ft) | Surface is gently rolling (0% - 1% max slope). Vegetation is grass less than 1 m in height. | None | |
| Fort Hood DZ | PK104528 | 2170 m × 820 m (7120 ft × 2690 ft) | 510/2310 | 283.5 m (930 ft) | Surface is gently rolling (0% - 1% max slope). Vegetation is grass less than 1 m in height. | None | One unimproved dirt road and two vehicle trails cross this area. |
| DZ Rapido | PK156725 | 2620 m x 1090 m (8590 ft x 3580 ft) | 1090/2890 | 274.3 m (900 ft) | Surface is gently rolling (2% - 3% max slope). Vegetation is grass less than 1 m in height. | None | Five vehicle trails cross this area. |

81





TROOP BILLETS

| TYPE | TOTAL NUMBER OF BUILDINGS | TOTAL CAPACITY, TROOPS* | CONDITION | REMARKS | | | |
|-----------|------------------------------|----------------------------|-----------|---|--|--|--|
| Permanent | 56 | 14,553 | Excellent | Built from 1965 to 1975. | | | |
| | 26 | 4,421 | Good | Built from 1955 to 1975; scheduled for moderni- zation. | | | |
| | 9 | 1,668 | Excellent | Under construction; to be completed by July - August, 1977. | | | |
| Temporary | 118 | 5,249 | Poor | Built in 1942 and 1943; these billets are not scheduled for renovation, and will be replaced by new structures. | | | |
| | | | | | | | |

FUTURE PLANS

The master plan for Fort Hood does not include additional construction beyond late 1978 or early 1979. Billets presently under construction include 9 separate billets previously discussed in the remarks column, and additional buildings such as company headquarters, supply, messhalls, etc., which will be in the company areas.

A total of 37 barracks buildings were modified

between 1972 and 1975.

As of May, 1977, 7 new barracks buildings were constructed. 2 more buildings will be completed in July, 1977. The design of the new troop billets is entirely different than the standard platoon barrack. Each building consists f

As of May, 1977, 7 new barracks buildings were constructed. 2 more buildings will be completed in July, 1977. The design of the new troop billets is entirely different than the standard platoon barrack. Each building consists of 6 to 8 "stacks" in a modular design. Each "stack", or module, has 3 floors with 4 rooms per floor and 3 people per room. Buildings have either 6 or 8 modules. 6-module barracks have a capacity of 204 troops with 1 dayroom. 8-module barracks have a capacity of 264 troops with 2 dayrooms. 2 of the 9 barracks complexes house both male and female personnel. All billets have 90 square feet per individual.

QUARTERS

| TYPE | TOTAL NUMBER | TOTAL CAPACITY & CURRENT OCCUPANCY | CONDITION | REMARKS |
|----------------------------------|-----------------|---|------------------------------------|--|
| Officer Family | 997 | 234 two bedroom 528 three bedroom 235 four bedroom 99% Occupied | 697 Good; 300 Excel- lent. | 696 units built 1950 to 1960; 300 units built 1974 to 1976; 1 farm house built 1941. |
| Enlisted Family | 5138 | 1700 two bedroom 1101 three bedroom 870 four bedroom 30 five bedroom 99% Occupied | 3158 Good; 1980 Excel- lent. | 3158 units built 1950 to 1960; 1980 units built 1974 to 1976. |
| Bachelor Officer | 6 | 435 total capacity | Excellent. | There are 6 permanent units; 4 built in 1956 and 2 in 1969. |
| Quarters | 16 | 46 total capacity | Poor. | These 16 units are temporary, all built 1942 and 2 in 1969. |
| Bachelor Enlisted Quarters | 26 | 573 | Poor | Built in 1942 and 1943; pre- viously BOQ's are now BEQ's. Four buildings with 48 spaces each are used as Post Stockade barracks. |
| Guest Quarters | 1 | 75 rooms 450 total capacity | Excellent. | Built in 1973. |

NOTE: One percent of the officer and enlisted housing is continually being cleaned (which includes painting and minor repairs, if necessary) between occupants.

FUTURE PLANS

There are no plans for further expansion of officer or enlisted family housing. The last units to be built are located in Comanche Villages I, II and VII, and were completed in

| MEDICAL FACILITIE | ES |
|-------------------|-----|
| ACILITY | DES |

Darnell Army Hospital has a 285-bed capacity. Included within the hospital is a four (4) bed intensive care unit, one (1) pulmonary unit, fifteen (15) respiratory units, ten (10) x-ray units, two (2) EKG units, and one (1) EEG unit. A helipad is located approximately 100 meters from the emergency entrance of the hospital. An average of four (4) flights per week are made to Fort Sam Houston and Brooks AFB in San Antonio, Texas to the medical facilities at those bases. San Antonio is about 240 Km (150 mi) south of Fort Hood. Flights are also made to Scott and White Medical Center in Temple, Texas, about 32 Km (20 mi) east of Fort Hood, but only on an emergency basis. (See Off-Post Urban Areas, Temple).

DESCRIPTION

There are sixty (60) medical doctors currently assigned to the hospital. A ninety-five (95) bed expansion is planned to start in 1979-80, and

scheduled to be finished in 1981-82.

TMC (troop medical clinic)

Darnell Army Hospital

There are twelve (12) troop medical clinics on Fort Hood. The major function of the TMC is to administer immunizations and practice only definitive treatments as in first aid care. Only two (2) TMC's have a medical doctor on the staff; the others use physicians' assistants as the only medical staff.

Dental Clinics

There are seven (7) dental clinics located on Fort Hood. A list of the clinics with the number of chairs and dentists follows:

| Clinic Name or Number | Number of Chairs | Number o Dentists |
|--------------------------|---------------------|----------------------|
| | | 40 |
| #2 | 14 | 12 |
| #3 | 18 | 10 |
| # 5 | 18 | 9 |
| #6 | 22 (20 in use) | 15 |
| #7 | 4 | 2 |
| Fairbanks | 18 | 16 |
| Parkins | 28 | 17 |

A 28-chair clinic is presently under construction, and will open sometime during the summer months of 1977. This clinic will replace numbers 3 and 7. A 28-chair clinic and a 78-chair clinic are projected to be built within a few years.

ENROLLMENT Enrollments are based on school-114C year 1976-1977 data. Clarke 1085 Elementary and Smith Junior High Schools are new additions to Fort Hood and serves the area near Comanche Villages 1, 11 and 111. Meadows Elementary school is lo-731 cated on the east side of Fort Hood, opposite the area of the other schools, and serves Chaffee village, McNair village, Wainwright Heights, and Patton Park. High School students attend the Killeen

REMARKS

High School approximately 5 km (3

miles) from the East Gate of Fort

further development of schools on

Fort Hood. However, the city of Killeen is currently planning a new High School to absorb the

rapidly expanding population of

the area.

Hood. There are ro plans for

SCHOOLS

CAPACITY

1350

900

960

TYPE

Elementary

Meadows

Clarke

Junior High

Smith

K. URBAN AREAS (CANTONMENT AREAS) (Continued)

RECREATION FACILITIES

| TYPF. | NUMBER | REMARKS | TYPE | NUMBER | REMARKS | |
|---------------------|--------|--|---------------------------------------|--------|---|--|
| Libraries | 6 | Condition of 4 generally good; 1 to be renovated, 1 | Ceramics | 15 | Good condition. | |
| | | to be demolished. | Ceramics Shop | 1 | Good condition. | |
| Recreational Center | 4 | Condition of 2 good; 1 needs painting and interior lighting improvement, 1 needs renovation. | Community Theater | 1 | Fair condition; needs renovation. | |
| Basebatt Field | 1 | Good condition. | Music Center | 3 | Condition of 1 good; Annex 1 and 11 need major repair due to age and design. | |
| Tennis Court | 21 | Good condition. | Girl Scouts | 3 | Poor condition; 1942 plumbing, painting, woodwork and electrical. | |
| Golf Course | 2 | Good condition. | | _ | | |
| Roller Skating Rink | 1 | Condition fair; interior needs woodwork. | Boy Scouts | 5 | Poor condition; 1942 plumbing; painting, woodwork and electrical repair required. | |
| Pool, Swimming | 6 | Condition of 5 good; modernization planned for FY 80 and FY 82. 1 pool is fair; updating planned for | Teen Club | 2 | Poor condition; 1942 plumbing; painting, woodwork and electrical repair required. | |
| | | FY 80. 2 pools are indoors. | 4-H Club | 1 | Good condition. | |
| Bowling Alley | 4 | Condition good; renovation planned for FY 79 and FY 82. | Theater, Motion Picture | 5 | Fair to good condition; some need repairs. | |
| Field House (Gym) | 8 | Condition good; modernization planned for FYs 78 to 82. | Outdoor Recreation (Special Services) | 1 | Operates the following facilities: boat launching ramp, motor- cross, parks, picnic areas, cottages, pavillions, beach, tent area, travel camp, snack bar, fishing, boat dock, go-carts, | |
| Softball Field | 14 | Condition good; 13 have lighting. | | | rallies, four-wheel vehicle, and model airplanes. | |
| Volleyball Court | 11 | Condition of 9 good; 2 are poor, needing resurfacing. | | | Recreational facilities for the troops at Fort Hood are lacking. All existing facilities are inadequate in number and over- | |
| Stadium | 1 | Condition good; lighted and has multi-purpose uses. | | | utilized. The DFE Master Planning Branch has several facilities identified for construction in the 1st Cavalry Division area, as well as supporting facilities for the 2nd Armored Division. | |
| Arts & Crafts | 3 | Poor to good condition; needs renovation and 1 due for demolition. | | | Other facilities have been placed on the master plan merely for possible funding through fiscal year 1984. The next In- | |
| Automobile Repair | 4 | Fair to good condition; 1 planned for renovation. | | | stallation Planning Board is scheduled to meet in November, 1977. | |
| Woodworking Shop | 2 | Good condition. | | | Outdoor recreational facilities for active duty personnel and their dependents are periodically renovated due to natural weathering effects. Construction of new dressing room facilities at the Lake Belton Recreation Area were completed in May, 1977. | |

| | UTILITIES | |
|----------------|---|--|
| TYPE | CAPACITY AND CURRENT LOAD | REMARKS |
| Electric Power | 100,000 KVA capacity; 60,000 KVA is average dally demand on system. | The demand as of 1 December, 1976 was 60,000 KW. Supply is sufficient at the present time. The supplier is Texas Power and Light Company. There are no plans to increase the capacity of electrica power on Fort Hood. |
| Gas | Average daily demand is 864,000 cubic feet; capacity unknown. | The supplier is Lone Star Gas Company. The present contract with Fort Hood states no maximum limit and all gas necessary will be delivered. The type of system used is looped, with one (1) 10-inch pipe and several 2-inch pipes. 30 percent of all gas is consumed by family housing. The single largest users are barracks, mess halls and motor pools. Sufficient lines exist on Fort Hood to meet the present requirements. As the demand for gas increases with new construction, adjustments to that demand will be met under the existing contract with Lone Star Gas Company. |
| Water Supply | The average daily demand is 6.43 million gallons. Lake Belton Reservoir has a 28.5 million gallon per day capacity. | The water supply is controlled by the Bell County Water Control and Improvement District number 1. Installation of a new pipeline from Lake Belton to new storage tanks on Fort Hood is scheduled to be completed in June, 1978. The tanks will hold 600,000 gallons each. Water from these tanks will also be piped to Copperas Cove in June, 1978. The Fort Hood water supply is more than adequate and should remain sufficient for several years. |
| Sewage | The peak daily demand of the system is 11 mil- lion gallons. The cap- acity of the treatment plant is only 9 MGD. | The sewage treatment plant is operated by the Bell County Water Control and Improvement District number 1. One (1) plant operates a primary and secondary stage treatment with the effluent discharged into the South Nolanville Creek. The plant is currently hydraulically overloaded, partly due to water infiltration into sewage lines. As of December, 1976, negotiations are being held to build an entirely new sewage treatment plant, but no plans have been finalized. |

TELECOMMUNICATIONS

| | TYPES OF LINES | MAIN CANTONMENT AREA | WEST FORT HOOD | NORTH FORT HOOD | TOTAL | REMARKS |
|----|------------------------------|-------------------------|-------------------|--------------------|-------|--|
| AA | (Autovon Access) | 999 | 228 | 19 | 1246 | The switching center is located in Bldg. 8 for |
| AR | (on-post and local off-post) | 1685 | 184 | 7 | 1876 | all calls originated on post. The central office |
| С | (on-post, only) | 1487 | 236 | 29 | 1752 | for Autovon is located in Ennis, Texas, near San |
| В | (govt. reimbursed by user) | 0 | 0 | 4 | 4 | Antonio, Texas. No future plans available. |

URBAN AREAS (Cantonment Areas)

AREA FEATURES

Family Housing, NCO

Barracks, Troop Quarters

Parade Grounds

Bachelor Officer Quarters

Outdoor Recreation Facilities

Guest Houses

Post Headquarters
Post Hospital
Post Exchange
Commissary
Chapel
Directorate of Facilities Engineering
Telephone Exchange
Electric Power Substation
Flight Obstructions
Central Texas College

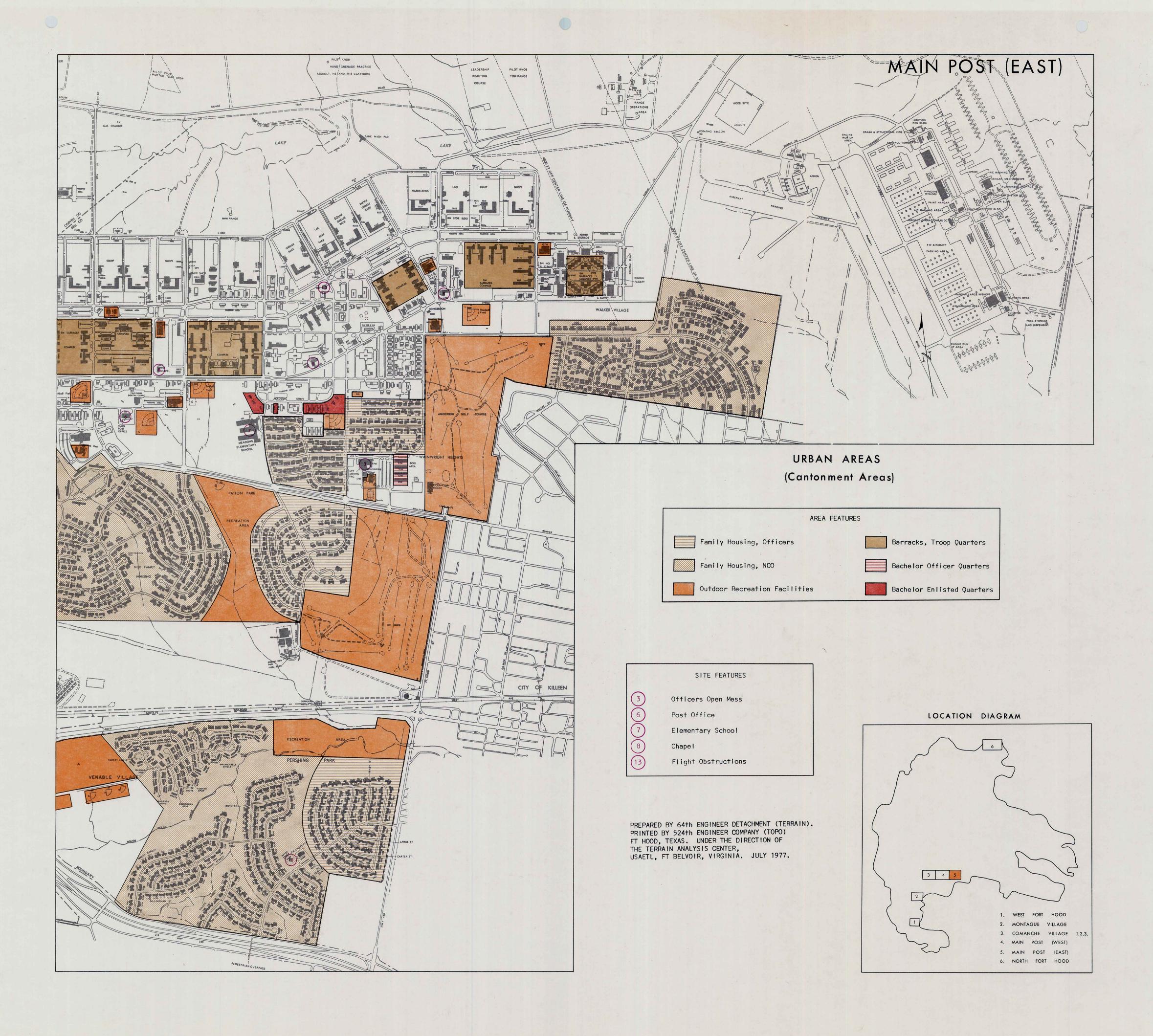
PREPARED BY 64th ENGINEER DETACHMENT (TERRAIN).
PRINTED BY 524th ENGINEER COMPANY (TOPO)
FT HOOD, TEXAS. UNDER THE DIRECTION OF
THE TERRAIN ANALYSIS CENTER,
USAETL, FT BELVOIR, VIRGINIA. JULY 1977.

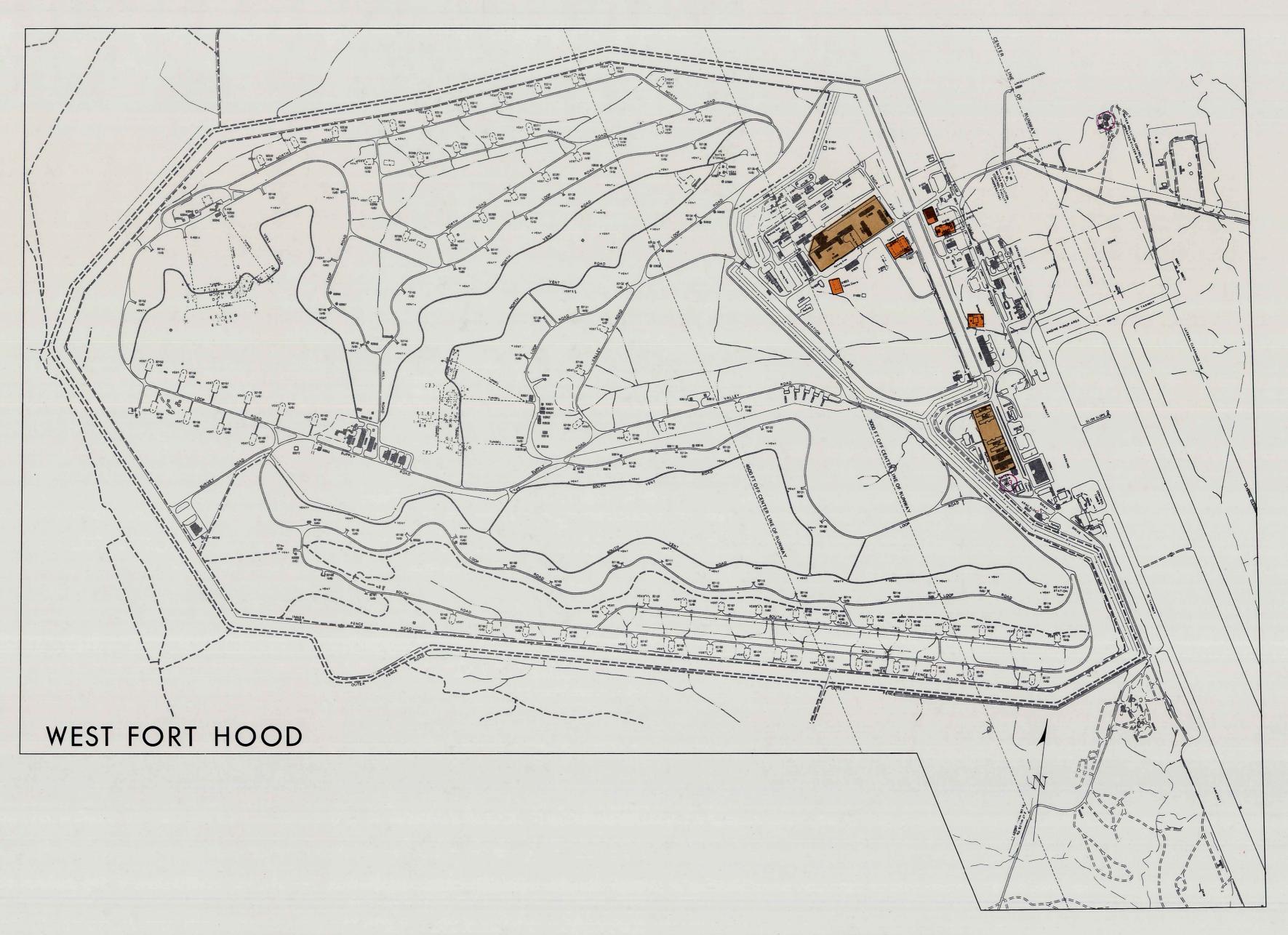


FORT HO TERRAIN

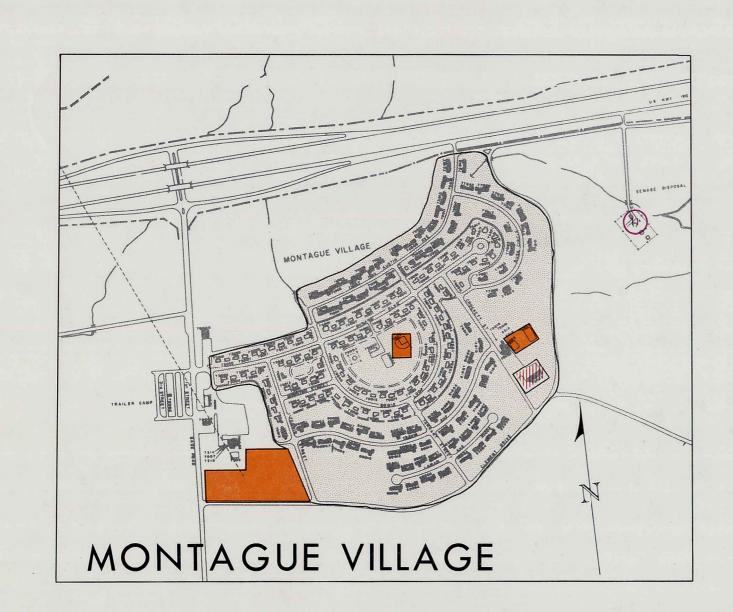
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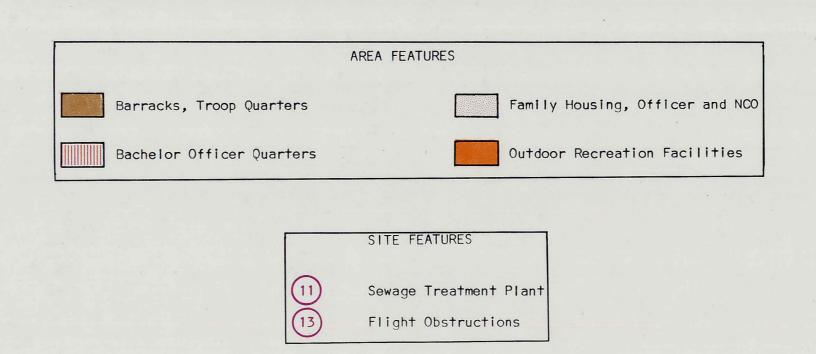
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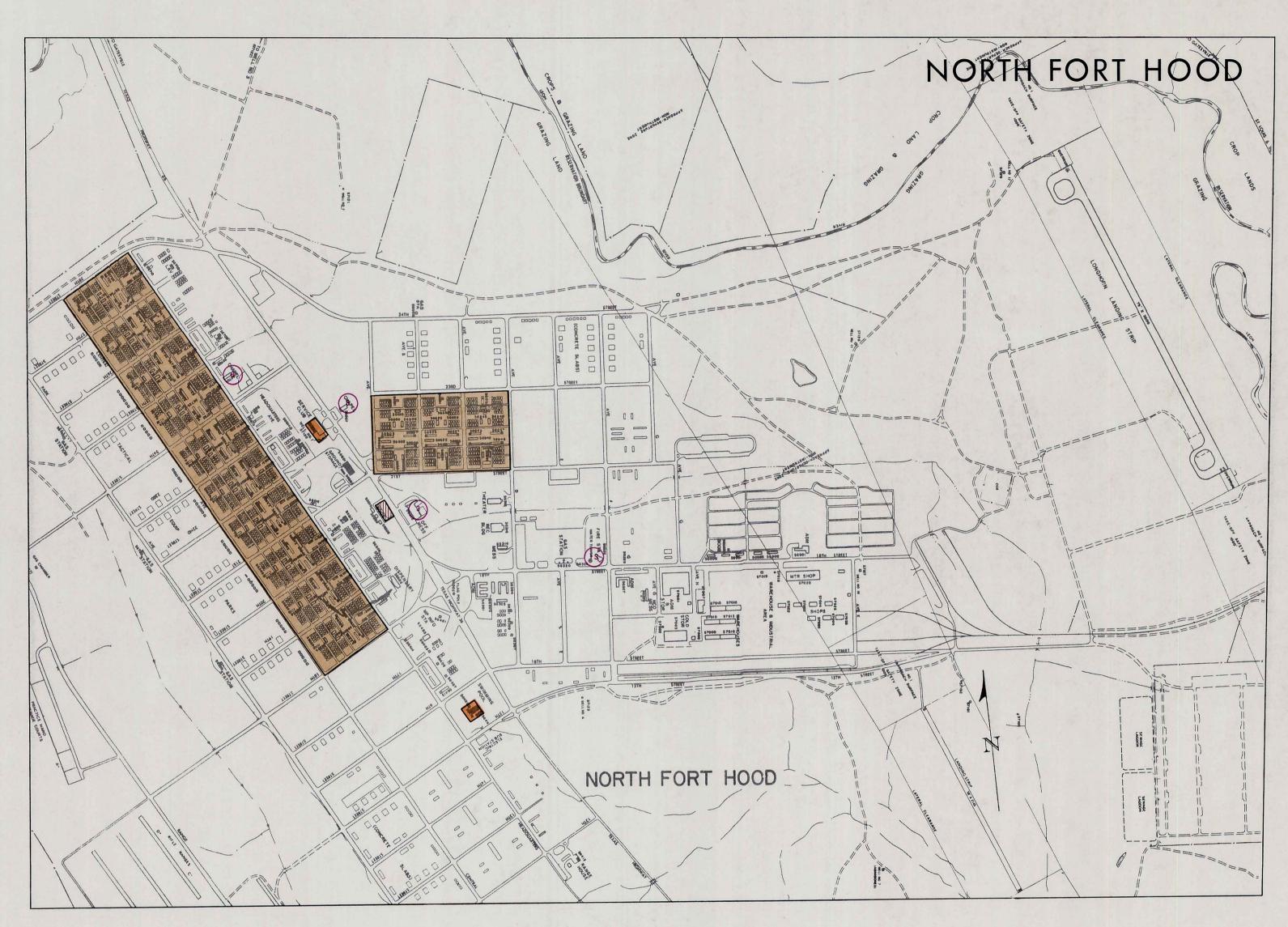
URBAN AREAS (Cantonment Areas)



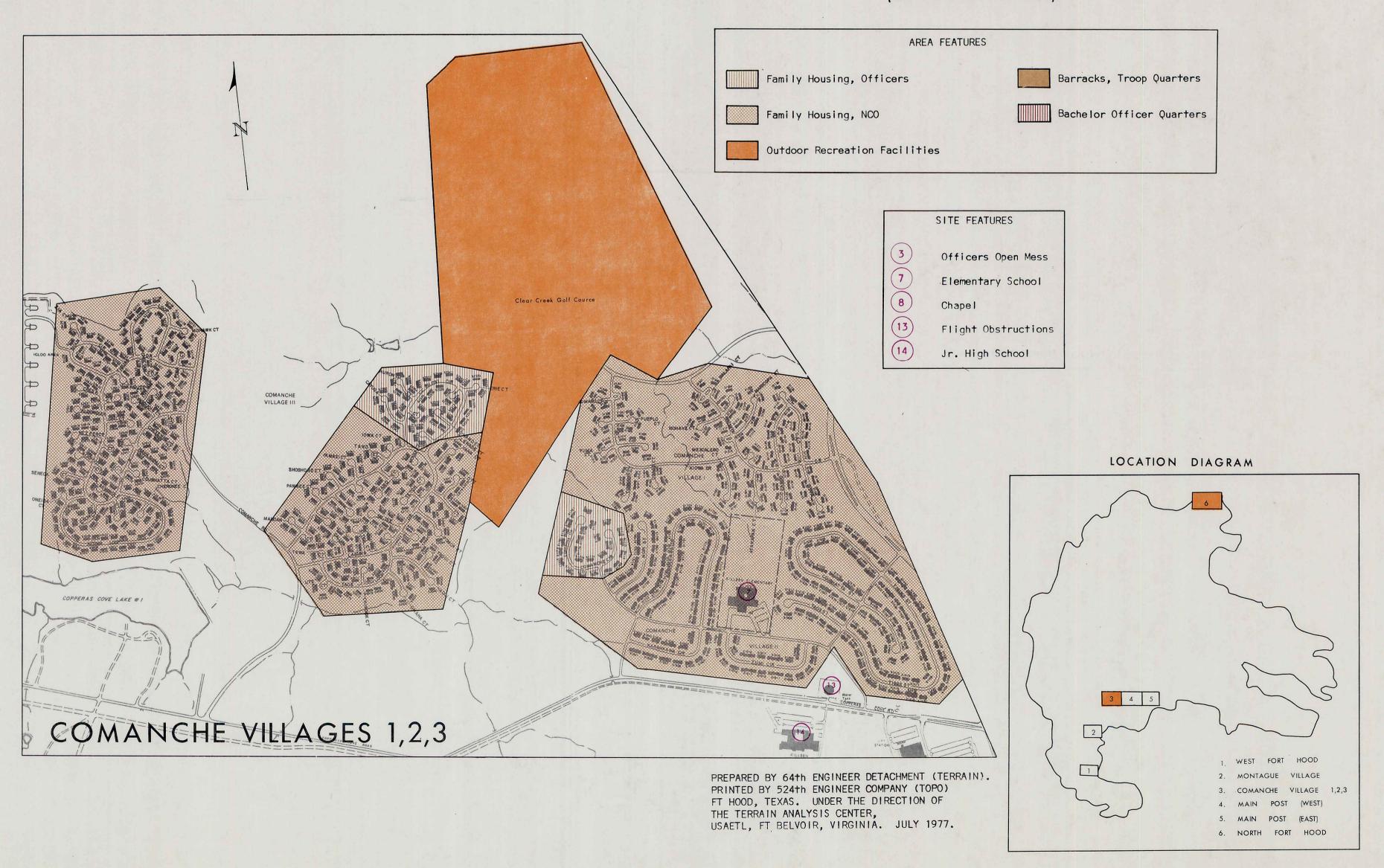


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1. WEST FORT HOOD
2. MONTAGUE VILLAGE
3. COMANCHE VILLAGE 1,2,3
4. MAIN POST (WEST;
5. MAIN POST (WEST;
6. NORTH FORT HOOD



URBAN AREAS (Cantonment Areas)



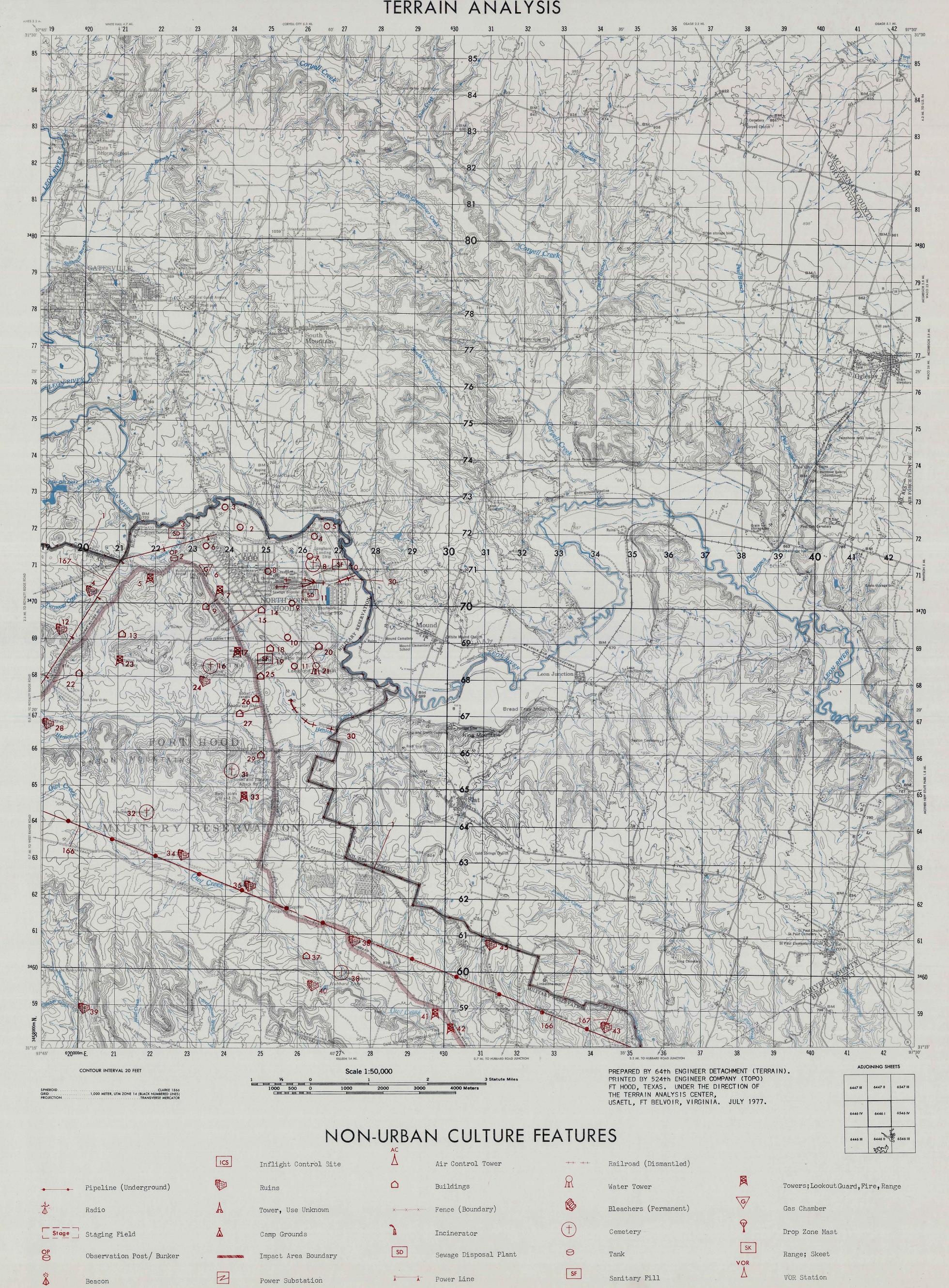
L. NON-URBAN CULTURAL FEATURES

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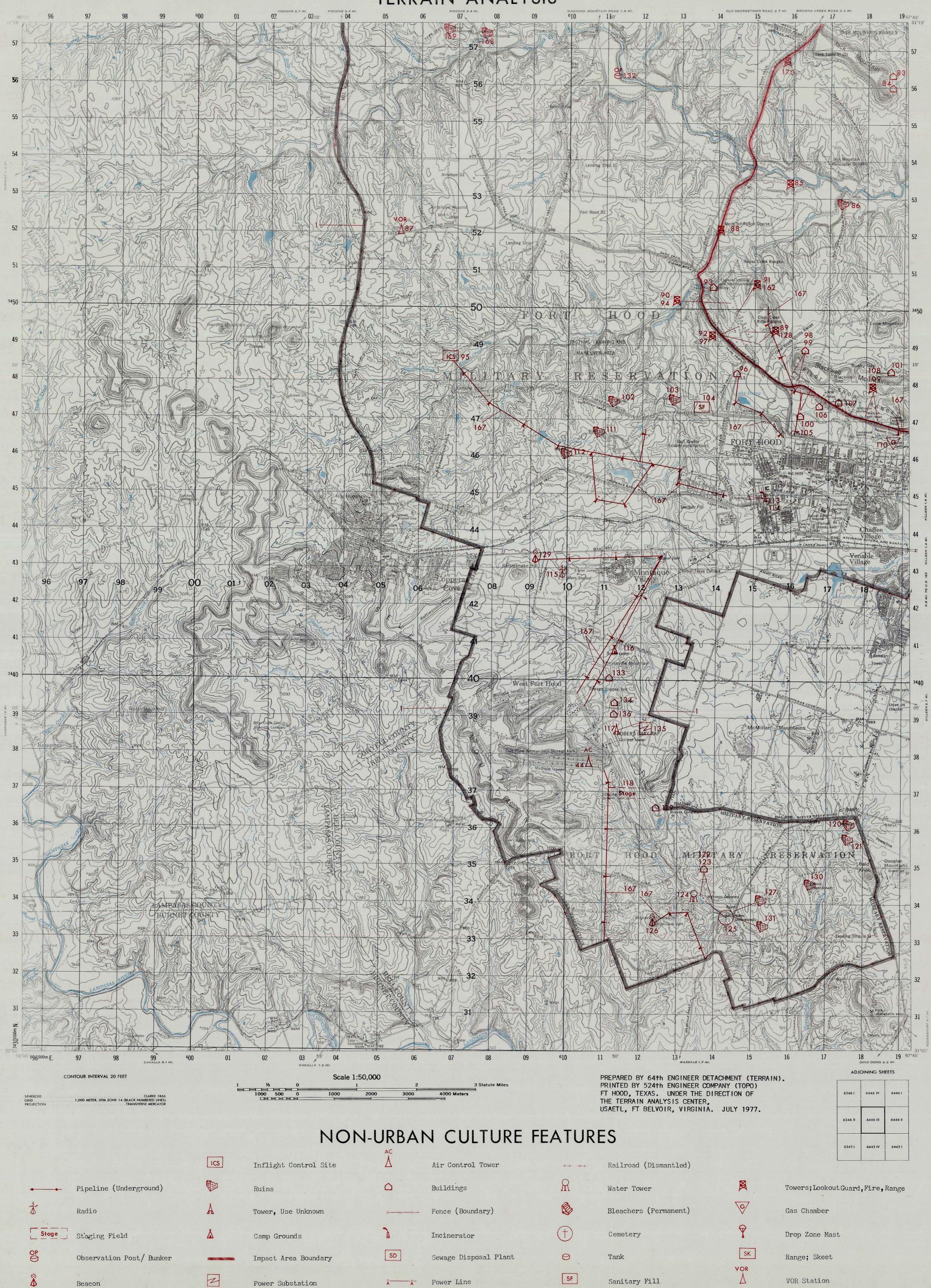
| MAP NUMBER | *GRID REFERENCE | DESCRIPTION MAD SUSET 6446 I | MAP NUMBER | *GRID REFERENCE | DESCRIPTION |
|------------|--|---|------------|----------------------------|---|
| 1 | | MAP SHEET 6446 | | _ | MAP SHEET 6446 11 |
| , | Fort Hood Military Reservation boundary is mostly a fence of metal, u-shaped pickets with two to four strands of barbed wire. Small sections of West Fort Hood and the main cantonment have chain-link fencing. | | 46 47 | 345578 294556 | LORAN antenna; approximately 30.5 m (100 ft) high. Tank Platoon Battle Run; generally 1.5 km (.9 mi) wide and 4 km (2.5 mi) long. |
| 2 | 225712 | Shelter; range observation. | 48 | 291537 | Curry Engineer Demolition Training Area; 900 meters (2,953 ft) in radius. |
| 3 | 225719 | Brown Cemetery; 2 graves; 7.3 m (24 ft) by 7.3 m (24 ft). | · 49 | 289522 | Curry Mortar North; 100 meter (328 ft) radius. A latrine is located on the range. |
| 4 | 202703 | Ruins. | 50 | 289518 | Curry Mortar Center; 100 meter (328 ft) radius. A latrine is located on the range. |
| 5 | 219706 | Tank Table IV North; 10 firing points and 5 tar- get lines. A control tower is located on the range. | 51 | 287517 | Curry Mortar South; 100 meter (328 ft) radius. |
| 6 7 | 233709 237703 | Gas chamber. Jump tower; approximately 22.9 m (75 ft) high. | 52 | 284514 | Brookhaven Recoilless Rifle Service; 6 firing points, 1,200 meter range, width varies with placement of |
| 8 | 264712 | Pleasant Grove Cemetery; 175 graves; 99.7 m (327 ft) by 77.8 m (255 ft). | 53 | 217500 | vehicles. Elm Knob Demolition Area; 900 meters (2,953 ft) in radius. A latrine is located on the range. |
| 9 | 23770 , | North Fort Hood Rifle Delta; 300 meters (984 ft) long, 150 meters (492 ft) wide. Latrines, target shed, and control tower are located on the range. | 54 | 219497 | Elm Knob CEV; 7 firing points, 1,200 meters (3,937 ft) long. A control tower and latrine are located on the range. |
| 10 | 263708 | Sanitary landfill (active). | 55 | 225491 | Sugar Loaf Tank Table V; 900 meters (2,953 ft) |
| 11 | 263704 | Sewage treatment plant and reservoir. | | | long. Zeroing panels are located 1,200 meters (3,937 ft) from firing line. A control tower and latrine are located on the range. |
| 12 13 | 194693 219691 | Ruins. LORAN Bombing Range; a point ground target is loc- | 56 | 223490 | Elm Knob Rocket Range; 6 firing points, 200 meters |
| | | ated at coordinates PK 21226779. | 57 | 221490 | (656 ft) long. A latrine is located on the range. Elm Knob M31 Artillery Trainer; 3 separate firing |
| 14 | 241698 | North Fort Hood Rifle Alpha; 500 meters (1,640 ft) long, 140 meters (459 ft) wide. Latrines, con- trol tower, and a target shed are located on the | | | points. |
| | | range. | 58 | 247490 | Sugar Loaf Tank Table & ; 17 firing points and a 60 meter (197 ft) target line. A latrine, control tower, and a target shed are located on the range. |
| 15 | 241694 | North Fort Hood Pistol; 25 meters (82 ft) long, 90 meters (295 ft) wide. A control tower, target shed, and latrine are located on the range. | 59 | 252489 | Sugar Loaf Mortar Range; 6 firing points. A lat- rine is located on the range. |
| 16 | 235683 | Bethel Cemetery; 190 graves; 62.2 m (204 ft) by 45.7 m (150 ft). | 60 | 266493 | Reed Mountain Mortar; 50 meter (164 ft) radius. A latrine is located on the range. |
| 17 | 245687 | North Fort Hood Submachine Gun; 150 meters (492 ft) wide and 60 meters (197 ft) long. A latrine, target shed, and control tower are located on the range. | 61 | 273494 | Trapnell TOW; 6 firing points with 1,600 meter (5,249 ft) range. Width of range varies with placement of vehicles. A control tower and |
| 18 | 252687 | Range office and water point. | 62 | 273495 | latrine are located on the range. Trapnell Vulcan; 6 Vulcans on the firing line. |
| 19 | 250685 | Dump area. | | | A control tower, latrines, and bleachers are located on the range. |
| 20 21 | 262686 262686 | North Fort Hood Range Office and water point. Water well; capped. | 63 | 274495 | Trapnell Helicopter Gunnery Range; 5 landing areas; bleachers. |
| 22 | 192678 | Tank Table VI North; 1,950 meters (6,398 ft) long | 64 | 224488 | Sugar Loaf Redeye Guided Missile range; 4 barri- |
| | | and 610 meters (2,001 ft) wide. A latrine, target shed, and control tower are located on the range. | | | caded firing points; bleachers and latrines are located on the range. |
| 23 | 210684 | Dalton Mountain Helicopter Gunnery Range; 2,300 meters (8,530 ft) in length, 250 meters (820 ft) wide. Two concrete pads, a VIP pad and a refueling pad. A latrine and control tower are located on | 65 | ∠30487 | Sugar Loaf Tank Table IV; 1,960 meters (6,430 ft) long. A control tower and 2 latrines are located on the range. |
| | | the range. | 66 | 234489 | Post Oak Artillery Direct Fire Range; 6 firing points and 4 target lines. |
| 24 25 | 234680 249681 | Ruins. Range control buildings. | 67 | 244489 | Sugar Loaf Tank Table III; 60 meters (197 ft) long. A bunker is located at the east end of the track. A latrine and control tower are located on the range. |
| 26 | 249674 | North Fort Hood Machine Gun Bravo; 30 meters (98 ft) long, 80 meters (262 ft) wide. A latrine, target shed, and control tower are located on the range. | 68 | 248488 | Tank Table IV East; 12 firing points and 8 target lines. 2,340 meters (7,677 ft) long. A control tower and latrine are loated on the range. |
| 27 | 250672 | North Fort Hood Machine Gun Alpha; 30 meters (98 ft) long, 120 meters (394 ft) wide. A latrine, target shed, and control tower are located on the range. | 69 | 259489 | Sugar Loaf Machine Gun Transition; 800 meters (2,625 ft) long, 300 meters, (984 ft) wide. A latrine, target shed, and control tower are located on the range. |
| 28 | 190667 | Ruins. | 70 | | |
| 29 | 249659 | Squad & Platoon Attack Course; a control tower, 2 machine gun pads, latrine, and target shed are loc- | | | (656 ft) wide. A latrine, target shed, and control tower are Located on the range. |
| 30 | 270666 | ated on the range. Dismantled railroad. | 71 | 215476 | Black Gap Alpha; 100 meters (328 ft) long, 340 meters (1,115 ft) wide. A latrine, target shed, and control tower are located on the range. |
| 31 | 241654 | Ruth Cemetery; 185 graves; 45.7 m (150 ft) by 62.2 m (204 ft). | 72 | 198469 | Pilot Knob Hand Grenade; 12 concrete throwing bays for hand grenades and 3 firing points for the M18 |
| 32 | 218643 | Friendship Cemetery; 200 graves; 64 m (210 ft) by | | | Claymore. A control tower and latrine are located on the range. |
| 33 | 245648 | 64 m (210 ft). Ruth Tank Table 1,2,3; 6 firing points, 60 meters | 73 | 214467 | Skeet and trap range. |
| | | (197 ft) long. A latrine, target shed, and control tower are located on the range. | 74 | 215465 | Ft. Hood Range Office and water point. |
| 34 | 228631 | Ruins. | 75 76 | 269469 274464 | Aqueduct; 1.4 m (4.5 ft) diameter. Water storage tanks (2); 6.1 m (20 ft) high, 22.3 m |
| 35 36 | 245622 275608 | Ruins. | | 2,,,,,,, | (73 ft) diameter, 2,268,000 liters (600,000 gallons) each. |
| 37 | 262604 | Hubbard Valley Demolition Area: 900 meters (2.953 ft) | 77 | 228460 | Control tower; 18.3 m (60 ft) high. |
| 38 | 272599 | in radius. A latrine is located on the range. Hubbard Cemetery; 200 graves; 94.5 m (310 ft) by | 78 | 373439 | Boy Scout Camp. |
| 39 | 201589 | 103.6 m (340 ft) by 100.6 m (330 ft). | 79 80 | 234446 to 388420 219479 | Underground pipeline; high pressure crude oil. Black Gap Charlie; 100 meters (328 ft) long, 220 |
| 40 | 263596 | Ruins. Ruins; 3. | | | meters (722 ft) wide. A latrine, control tower, and target shed. |
| 41 | 298589 | Crittenberger Range; 7.3 km (4.5 mi) between the east and west zero points. 10 firing positions | 81 | 193472 | Jackson Knob M31 Artillery Trainer; 4 separate firing points. A latrine is located on the range. |
| 42 | 302584 | Cold Springs Helicopter Gunnery Range; 2,600 meters (8,528 ft) in length and 900 meters (2,952 ft) wide | 82 | 315570 | Ruins. |
| 43 | 343585 | A control tower and latrine are located on the range. Ruins. | | | |
| 44 | 111383 | Control tower; 27 m (81 ft) high. | | | |
| 45 | 312608 | Ruins. | | | |

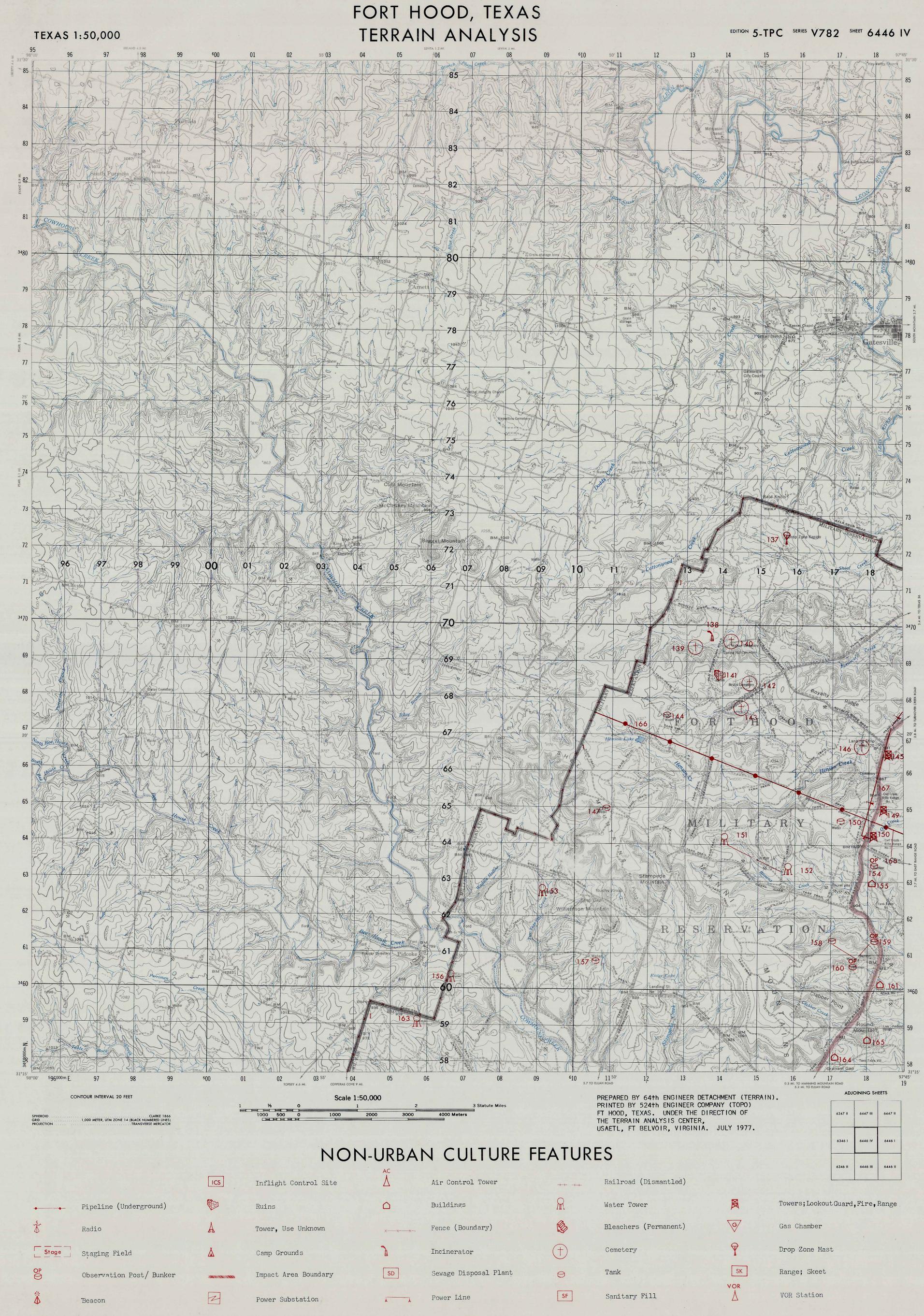
L. NON-URBAN CULTURAL FEATURES (Continued)

| MAP NUMBER | *GRID REFERENCE | DESCRIPTION MAP NUMBER *GRID REFERENCE | | *GRID REFERENCE | DESCRIPTION | | |
|------------|------------------|--|--------------|---|---|--|--|
| | N | MAP SHEET 6446 III | 128 | 147494 | Clear Creek One Charlie; 300 meters (984 ft) long, | | |
| 83 | 187563 | West Range Mortar #5; 100 meter (328 ft) radius of the surveyed point marker. A latrine is 10-cated on the range. | | | 200 meters (656 ft) wide. A latrine, target shed, and control tower are located on the range. Bleachers. | | |
| 84 | 187560 | West Range Mortar; 100 meter (328 ft) radius of | 129 | 092432 | Light tower; approximately 27.4 m (90 ft) high. | | |
| | | the surveyed point marker. A latrine is located on the range. | 130 | 165346 | Water point; abandoned. | | |
| 85 | 160534 | House Creek Demolition Area; 900 meters (2,953 ft) in radius. | 131 | 145337 | Water point: abandoned. | | |
| 86 | 173529 | Ruins. | 132 | 113563 | Underground bunkers; 6. | | |
| | 055521 | VOR station; 7.3 m (24 ft) high. | 133 | 112401 | Parachute club house. | | |
| 87 88 | 143523 | Mechanized Rifle Squad Proficiency Course; 2 km | 134 | 113394 | Fuel point; 2 buildings. | | |
| 00 | 143323 | (1.2 mi) course route. A control tower, target shed. and latrine are located on the range. | 135 136 | 122388 113391 | Receiver building and power substation. Compressed air station. | | |
| 89 | 151491 | Clear Creek Machine Gun Alpha; 100 meters (328 ft) long, 170 meters (558 ft) wide. A latrine, target shed, and control tower are located on the range. | ,22 | | | | |
| 90 | 144502 | Clear Creek Two Alpha; 300 meters (984 ft) long, 150 meters (492 ft) wide. A latrine, target shed, and control tower. Bleachers. | | MAP SHEET 6446 IV | | | |
| 91 | 145498 | Clear Creek One Bravo; 100 meters (328 ft) long, 220 meters (722 ft) wide. A latrine, target shed, and control tower. | 137 138 | 157723 137696 | Drop Zone Rapido. Chimney; 19.8 m (65 ft) high. | | |
| 92 | 146496 | Clear Creek Two Charlie; 300 meters (984 ft) long, | 139 | 139693 | Spring Hill Cemetery; 40 graves; 73.1 m (240 ft) | | |
| 7- | | 200 meters (656 ft) wide. A latrine, target shed, and control tower are located on the range. Bleachers. | 1, | | by 56.7 m (186 ft). | | |
| 93 | 139506 | Field Fortification; 900 meters (2,953 ft) long by 350 meters (1,149 ft) wide. A latrine is located | 140 | 142695 | Walker Cemetery; 120 graves; 67 m (220 ft) by 53.3 m (175 ft). | | |
| | 444500 | on the range property. Clear Creek Machine Gun Bravo; 100 meters (328 ft) | 141 | 139685 | Ruins. | | |
| 94 | 144502 | long, 170 meters (558 ft) wide. A latrine, target shed, and control tower are located on the range. | 142 | 148684 | Bruce Cemetery; 4 graves; 7.3 m (24 ft) by 7.3 m (24 ft). | | |
| 95 | 069486 | Navigational aid station. | 143 | 146677 | White Cemetery; 8 graves; 9.1 m (30 ft) by 12.2 m (40 ft). | | |
| 96 | 146483 | ULS, (universal loading simulator). 8.8 m (29 ft) wide, 37.2 m (1-2 ft) long, and 4.9 m (16 ft) high. | 144 | 125675 | Water tank; 1.1 m (3.5 ft) high, 4.6 m (15 ft) diameter; abandoned. | | |
| | | Used to simulate loading C-130, C-141, and C-5A aircraft. 31 wooden bulkheads covered with corrugated steel sheets on a concrete stab resembles an | 145 | 184665 | North Fort Hood Mortar Teardrop; 150 meters (492 ft) wide, 400 meters (1,312 ft) long. A control tower | | |
| | | aircraft fuselage. | | | and latrine are located on the range. | | |
| 97 | 149492 | Clear Creek One Alpha; 300 meters (984 ft) long, 150 meters (492 ft) wide. A latrine, target shed, | 146 | 178666 | Elam Cemetery; 6 graves; 9.1 m (30 ft) by 9.1 m (30 ft). | | |
| 98 | 160482 | and control tower are located on the range. Bleachers. Pilot Knob Pistol Alpha; A control tower, latrine, | 147 | 109649 | Water tank; 1.1 m (3.5 ft) high, 4.6 m (15 ft) diameter; abandoned. | | |
| 99 | 162481 | and target shed are located on the range. Pilot Knob Pistol Bravo; 50 meters (164 ft) long, 50 meters (164 ft) wide. A control tower, target | 148 | 181642 | Owl Creek One; 360 meters (1,181 ft) long, 480 meters (1,575 ft) wide. A latrine, target shed, and control tower are located on the range. Bleachers. | | |
| 100 | 165478 | shed, and latrine are located on the range. 149 183649 Combat Pistol Qualification Course; A latrine and | | Owl Creek Two; 360 meters (1,181 ft) long, 480 meters (1,575 ft) wide. A latrine, target shed, and control tower are located on the range. Bleachers. | | | |
| | | control tower are located on the range. | 150 | 173646 | Water tank; 2.1 m (7 ft) high, 4.6 m (15 ft) diameter; | | |
| 101 | 187484 | Blackwell Artillery Direct Fire; 3 firing positions. | | | broken-down trough; abandoned. | | |
| 102 | 113475 | Ruins. | 151 | 149636 | Water tower. | | |
| 103 | 128476 136474 | Ruins. Sanitary landfill (active). | 152 | 150636 | Water tower. | | |
| 104 105 | 163480 | Pilot Knob Pistol Charlie; 50 meters (164 ft) long, | 153 154 | 091626 182634 | Water tower; unserviceable. Bunker. | | |
| 103 | 103400 | 220 meters (722 ft) wide. A shed covers the entire firing line. Latrines, target shed, and briefing room are located on the range. | 155 | 181629 | Tank Table VII; 4.4 km (2.7 mi) course route. | | |
| 106 | 168474 | Sportsman Rifle/Pistol; 200 meters (656 ft) long, | 156 | 067603 | Water tower; pentagon-shaped. | | |
| 100 | 100771 | 15 meters (49 ft) wide. A latrine and target shed are located on the range. | 157 | 106608 | Water tank; 1.1 m (3.5 ft) high, 4.6 m (15 ft) diameter; abandoned. | | |
| 107 | 173474 | Pilot Knob Rifle Bravo; 600 meters (1,769 ft) long, 300 meters (984 ft) wide. A latrine is located on the range. | 158 | 177608 | Water tank; 2.1 m (7 ft) high, 4.6 m (15 ft) di- ameter; trough half way around it; abandoned. | | |
| 108 | 180471 | Pilot Knob Submachine Gun/Shotgun Range; 10 points, 90 meters (295 ft) long. A control tower, target | 159 | 178609 | Bunker. | | |
| | | shed, and latrine are located on the range. | 160 | 176606 | Bunker. | | |
| 109 | 184470 | Pilot Knob Grenade Launcher; 180 meters (592 ft) wide, 500 meters (1,640 ft) long. A latrine, target shed. and control tower are located on the range. | 161 | 183601 | Tank Zero Range; 5 firing points, 1,200 meters (3,937 ft) long. | | |
| 110 | 188465 | Gas chamber. | **162 | 145498 | Clear Creek Two Bravo; 100 meters (328 ft) long, 220 meters (722 ft) wide. A latrine, target shed, and control tower. | | |
| 111 | 108467 | Ruins. | 163 | 058591 | Water tower. | | |
| 112 | 099463 | Open well; no side structure. | 164 | 171581 | Tank Table VIII; 3 course routes designated as NORTH, CENTER, and SOUTH. 2 km (1.2 ml) course routes. | | |
| 113 114 | 149450 | Incinerator; 18.3 m (60 ft) high. | 165 | 180586 | Round Mountain Helicopter Gunnery; 5 pads, FIRE LINE | | |
| 115 | 149449 099428 | Incinerator; 19.8 m (65 ft) high. Radio tower, MARS; 18.3 m (60 ft) high. | 105 | .00530 | is PK 183587 to PK 202594. | | |
| 116 | 113409 | Scout camp. | 166 | 105676 to 353580 | Underground pipeline; high pressure crude oil. | | |
| 117 | 121389 | Tower; 12.2 m (40 ft) high. | 167 | - | Power lines; primary and secondary service. | | |
| 118 | 115369 | Staging area. | **168 | 077574 | Ruins. | | |
| 119 | 125369 | Compressed air station with storage buildings. | 169 | 067575 | Water point; abandoned. | | |
| 120 | 177362 | Water point; abandoned. | 170 | 159568 | Tank Table VI South; 2 2.4 km (1.5 mi) course routes. A classroom, control tower, latrine, and helicopter | | |
| 121 | 176358 | Ruins. | | | landing area are located on the range. | | |
| 122 | 137342 | Ruins; abandoned summer camp, Camp Moonraker. | | | | | |
| 123 | 140340 | Latrine, building. | NOTE: The | following features have stan | ndard dimensions and are found on almost all ranges. | | |
| 124 | 135342 | Water tower; 4.9 m (16 ft), abandoned. | 1 | Length Latrines, 3.7 m (12 | Width Height 2 ft) 2.7 m (9 ft) 3.1 m (10 ft) | | |
| 125 | 138342 | Mayberry Cemetery; 24 graves; 42.6 m (140 ft) by 45.7 m (150 ft). | 2. 1 3. (| Target sheds, 7.3 m (24 Control towers, 2.4 m (8 Heachers 12.2 m (40 | 1 ft) 3.7 m (12 ft) 3.1 m (10 ft) ft) 2.4 m (8 ft) 4.6 m (15 ft) | | |
| 126 | 124335 | Obstruction light; 7.6 m (25 ft) high. | | | | | |
| 127 | 145338 | Ruins. | | references begin with PK des tures are located on Sheet 6 | | | |



FORT HOOD, TEXAS TERRAIN ANALYSIS





III. OFF-POST FEATURES

A. AIRFIELDS

Waco-Madison Cooper Airfield is the only airfield within a fifty-mile radius of Fort Hood that meets FAA requirements to accept C-130 aircraft or larger.

| MAP NUMBER &/OR NAME; LOCATION; | ELEVATION | | TAXIWAY, PARKING, APRON | | BUIL | DING INFORMATION | | | | |
|--|---|--|--|--|---------------------|---|--|---|--|---|
| TYPE; & CLASS- | AND STATUS | RUNWAY DESCRIPTION | AND HARDSTAND AREA DESCRIPTION | BUILDING | IDENT. NUMBER | FLOOR SPACE | CONSTRUCTION MATERIAL | POL FACILITIES | NAVIGATIONAL AIDS | REMARKS |
| 1. Waco-Madison Cooper; PK6898; 31°36' N. lat.; 97°14' W. long.; Civil; Airfield | 1. Elevation: 157.3 m (516 ft) 2. Status: Operational | a. Dimensions: L-2011.7 m (6600 ft) W-45.7 m (150 ft) b. Bearing: 0100-1900 c. Runway Weight Bearing Capacity: *\$50 T82 ST104 d. Surface Material **H (ASP) e. Condition: Excellent 2. Runway 14-32 a. Dimensions: L-1798.3 m (5900 ft) W-45.7 m (150 ft) b. Bearing: 1400-3200 c. Runway Weight Bearing Capacity: S50 T82 ST104 d. Surface Material: H (ASP) e. Condition: Excellent 3. Runway 05-23 a. Dimensions: 1676.4 m (5500 ft) 45.7 m (150 ft) b. Bearing: 0500-3200 c. Runway Weight Bearing: 0500-3200 c. Runway Weight Bearing Capacity: 526 d. Surface Material: H (ASP) e. Condition: | 1. Taxiway Width: a. Runway 01-19 45.7 m (150 ft) b. Runway 14-32 45.7 m (150 ft) c. Runway 05-23 17.1 m (56 ft) 2. Taxiway Load Capacity a. Runway 14-32 ST104 b. Runway 14-32 ST104 c. Runway 05-23 S26 3. Taxiway Surface Material H (ASP) For All Taxiways 4. Total Area a. Parking Area 251,897.3 m² (2,711,400.0 ft²) b. Apron 11,148.4 m² (120,000.0 ft²) c. Hardstand 263,045.5 m² (2,831,400.0 ft²) 5. Load Capacity a. Parking Area 526 b. Apron S50 T82 ST104 6. Surface Material a. Parking Area H (ASP) b. Apron Condition: Excellent | Hangar Hangar Hangar Single T-Hangar (10 cell) T-Hangar T-Hangar T-Hangar T-Hangar (6 cell) Hangar (Private) Terminal Weather Bureau General Aviation Terminal Shop Buildings Single T-Hangar (10 cell) Proposed 1980 Twin T-Hangar (6-cell) Proposed 1980 | 205 704 218 N | 1,161.3 m ² (12,500 ft ²) 4,064.5 m ² (43,750 ft ²) 1,207.7 m ² (3,000 ft ²) 1,393.5 m ² (15,000 ft ²) " " " " " 1,114.8 m ² (12,000 ft ²) 1,855.8 m ² (19,976 ft ²) 1,577.1 m ² (16,976 ft ²) 1,577.1 m ² (16,976 ft ²) 186.3 m ² (2,005 ft ²) 186.3 m ² (2,005 ft ²) 186.3 m ² (2,005 ft ²) 1,393.5 m ² (15,000 ft ²) 1,114.8 m ² (15,000 ft ²) 1,114.8 m ² (12,000 ft ²) | *** CF/WB/SS/SR AF and CF/WB/WW/SR CF/SB/SS/SR "" "" "" "" CF/SB/SS/SR CF/SB/SS/SR | 1. Type Fuels: a. 100L b. Jet 2. Storage Facilities: a. 2 ea 10,000 gal underground tanks for a total of 20,000 gal 100L with one bottom load pump trough and manifold. b. 2 ea 10,000 gal underground tanks for a total of 20,000 gal Jet Fuel with one pump per tank. c. 1 ea 1,000 gal underground tank with pump (fuel not for sale to the pub- lic). | 1. Elevation top of Control Tower: 179.5 m (589 ft) 2. Navigational Aids: a. BVORTAC b. NDB (DME) c. ILS 3. Lighting: a. Rotating Beacon b. Runway or Strip Lights c. High Intensity Runway Lights (Runways 01-19) d. High Intensity Approach Lights (Runways 10-19) e. Sequence Flashing Lights (Runways 01-19) f. Medium Intensity Runway Lights (Runways 14-32) | Construction of T-hangars on ramp area is unfinished. Operations are not limited; all construction is lighted and marked. Taxi lanes are the only safe areas to taxi, due to aggregate on the hardstand. Obstructions in the flight path: Runway Obstruction 19 Post 05 Tree 23 Tree 14 Road 32 Road HT. 9 m (9.4 ft) 5.2 m (17.4 ft) 10.2 m (33.5 ft) 4.4 m (14.4 ft) 4.6 m (15.2 ft) |

^{*} NOTE; Runway weight bearing capacity in pounds (gross weight of aircraft) is determined by adding 000 to figure following S, T, ST, TT, TDT. Runway weight bearing capacity given is for unlimited operations. Aircraft weight higher than given requires prior permission from aerodrome controlling authority.

*** Building Construction Codes are identified by the abbreviations listed below.

S - Runway weight bearing capacity for aircraft with single-wheel type landing gear (C-47, F100). T - Runway weight bearing capacity for aircraft with twin-wheel type landing gear (C-5A).

ST - Runway weight bearing capacity for aircraft with single-tandem landing gear (C-130). TT - Runway weight bearing capacity for aircraft with twin-tandem type (includes quadricycle) landing gear (B-52, C-135).

TDT - Runway weight bearing capacity for aircraft with twin-delta tandem landing gear (C-5).
**H (ASP) - Surface material of runway is: hard surface asphaltic concrete.

For further information, see DOD Flight Information Publication, (enroute IFR-Supplement United States).

CP - Concrete pad floor with gravel adjoining CF - Concrete floor

AF - Asphaltic concrete floor PL - Pile foundation

WF - Wood flooring WB - Wood beam construction

SB - Steel beam construction WW - Wood walls

MW - Concrete block masonry walls

SS - Galvanized steel siding

NW - No walls

PS - Prestressed concrete walls SR - Galvanized steel roofing

B. URBAN AREAS

| NAME AND LOCATION | POPULATION | HOUSING AVAILABILITY | EDUCATIONAL FACILITIES | RECREATIONAL FACILITIES | MEDICAL FACILITIES | UTILITIES |
|---|--|--|--|---|---|---|
| <pre>I. Belton, Tx. 31 02' N. lat. 96 30' W. long.; PK 4737</pre> | Latest Census: 8,696 (1970) Current Estimated Population: 10,000 (1976) Projected Population 1980: No Data | Total Number of Houses: 3,031 Number Owner Occupied: 1,814 Number Renter Occupied: 1,217 Number Vacant Year round: None Number of Single Unit Dwellings: 2,611 Percent Single Family Units: 86.14 % Single Family Units for Rent: 48 Multi-Family Apts. for Rent: 125 Number of Subdivisions Under Development: 3 (1970 data) | 4 Elementary Schools: Grades 1 - 5 1 Junior High School: Grades 6 - 8 1 High School: Grades 9 - 12 Total Enrollment (Grades 1 - 12) 3,214 ADA (average daily attendance) Nearest Community College: Temple Junior College Nearest Public College: University of Texas at Austin Nearest Private College: Mary Hardin Baylor College Nearest Public Technical Institute: Texas State Technical Institute (1976 data) | Number of Parks: 2 Public, total of 20 acres. Number of Tennis Courts: 6 Number of Athletic Fields: No Data Number of Golf Courses: No Data (1976 Data) | There are no public, private or church related hospitals in Belton as of 1975. 1 Nursing Home 91 Beds Doctor to Population Ratio: 1:1667 Dentist to Population Ratio: 1:3333 | Electric Power: Electric power is supplied by Texas Power and Light Company. Largest distribution line is 12.5 kv. Sewage: The City of Belton is the controling agency for sewage disposal. The maximum rated capacity of treatment system is 0.6 million gallons per day (MGD). The average daily demand on the system is 0.1 MGD. The peak daily demand is .80 MGD. The capacity in excess of daily demand is rated at 0.4 MGD. Water: The city of Belton supplies all water. The maximum rated treating capacity is 4.0 MGD. Average daily demand on water system is .94 MGD. Peak daily demand is 1.9 MGD. The rated capacity in excess of daily demand is 3.06 MGD. Largest water main is 21 inches in diameter. There are plans in existance for the expansion of the city water system. Gas: Natural gas is supplied by the Lone Star Gas Company. Diameter of the largest transmission line is 4.0 inches. The pressure reading of this line is 250 pounds per square inch (PSI). The second largest line is also 4 inches in diameter and has a pressure reading of 30 PSI. |
| 2. Burnet, Tx. 30 43' N. lat. 98 14' W. long.; NK 7403 | Latest Census: 2,864 (1970) Current Estimated Population: 4,500 (1976) Projected Population 1980: No Data | Total Number of Houses: 1,128 Number Owner Occupied: 779 Number Renter Occupied: 349 Number Vacant Year round: None Number of Single Unit Dwellings: 1,040 Percent Single Family Units: 92.2 % Single Family Units for Rent: 25 Multi-Family Apts. for Rent: 10 Number of Subdivisions Under Development: 10 (1970 data) | 2 Elementary Schools: Grades K - 5 1 Junior High School: Grades 6 - 8 1 High School: Grades 9 - 12 Total Enrollment (Grades K - 12) 1,544 ADA Nearest Community College: Central Texas College Nearest Public College: University of Texas at Austin Nearest Private College: American Technological University Nearest Public Technical Institute: Texas State Technical Institute (1976 data) | Number Of Parks: 4, total of 20.2 acres. Number of Tennis Courts: 6 Number of Athletic Fields: No Data Number of Golf Courses: No Data (1976 data) | 1 Hospital (Sheppard Memorial Hospital) 75 Beds 2 Clinics Number of Doctors: 10 (1976) Number of Dentists: 3 (1976) Doctor to Population Ratio: 1:450 Dentist to Population Ratio: 1:1500 | Electric Power: The Lower Colorado River Authority serves the city of Burnet. The largest distribution line is 12.5 kv. The second largest line is 7.2 kv. Sewage: The city of Burnet is the agency for treatment and disposal. The maximum rated capacity for treatment is .52 MGD. Average daily demand on system is .30 MGD and peak daily demand on system is .42 MGD. Capacity of system over the daily average is .22 MGD. Water: Water is supplied by the city of Burnet. The maximum treat- ing capacity is .70 MGD. Average daily demand is 0.4 MGD and peak daily demand is 1.4 MGD. Capacity in excess of daily demand is 0.3 MGD. The largest water main is 8.0 inches with a pressure of 78 PSI. Plans for expansion exist. Gas: The supplying company is the Lone Star Gas Company. The largest line is 6.0 inches in diameter and pressure is 350 PSI. The second largest line is 3.0 inches with 25 PSI. |
| 3. Clifton, Tx. 31 45' N. iat. 97 35' W. long.; PL 3517 | Latest Census: 2,578 (1970) Current Estimated Population: 2,688 (1973) Projected Population 1980: No Data | Total Number of Houses: 1,046 Number Owner Occupied: 775 Number Renter Occupied: 271 Number Vacant Year round: None Number of Single Unit Dwellings: 989 Percent Single Family Units: 94.55 % Single Family Units for Rent: 0 Multi-Family Apts. for Rent: 72 Number of Subdivisions Under Development: 5 (1970 data) | I Elementary School: Grades K - 8 Junior High School: None I High School: Grades 9 - 12 Total Enrollment (Grades K - 12) 739 ADA Nearest Community College: Mclennan Community College Nearest Public College: Tarleto State University Nearest Private College: Texas Wesleyan College Nearest Public Technical In- stitute: Texas State Technica Institute (1976 data) | | 1 Hospital (Goodall-Witcher Hos- pital Foundation) 64 Beds Number of Doc- tors: 2 (1974 data) Number of Den- tists: 2 (1972 data) Doctor to Population Ratio: 1:896 Dentist to Population Ratio: 1:1344 | Electric Power: Power is supplied by the Community Public Service Company. The largest distribution line is 136.8 kv. and the second largest line is 14.4 kv. Sewage: The city of Clifton provides sewage disposal. Maximum capacity for disposal treatment is 0.8 MGD. Average daily demand on the system is .43 MGD. Peak daily demand on the disposal system is .47 MGD. Capacity of system in excess of daily demand is .37 MGD. Water: Water is supplied by the city of Clifton. The maximum capacity for water treatment is 1.0 MGD. Average daily demand on treatment system is 0.4 MGD. Peak daily demand is |

0.4 MGD. Peak daily demand is 0.9 MGD. The capacity in excess of daily demand is 0.6 MGD. The largest water main is 8.0 inches with a pressure of 85 PSI. Plans exist for expansion as needed.

Gas: Natural gas is supplied by the Lone Star Gas Company.
The largest distribution line is 4.0 inches in diameter with

a pressure reading of 325 PS1. The second largest line is 3.0 inches with a pressure of 30 PS1.

العديدية الوهيم وطاريك والإمواء يومعواريء

| NAME AND LOCATION |
|--|
| 4. Copperas Cove, Tx. 31 05' N. lat. 97 55' W. long.; PK 0544 |
| 5. Gatesville, Tx. 31 24' N. lat. 97 46' W. long.; PK 1978 |
| 6. Goorgetown, Tx. 30 36! N. Jat. |

Total Number of Houses: 3,300 Latest Census: 10,818 (1970) Number Owner Occupied: 1,539 Current Estimated Number Renter Occupied: 1,761 25,101 (1976) Projected Population

POPULATION

Population:

No Data

1980:

Number Vacant Year round: None Number of Single Unit Dwellings: 2,542 Percent Single Family Units: 77.03 % Single Family Units for Rent: Multi-Family Apts. for Rent: Number of Subdivisions Under Development: 7

HOUSING AVAILABILITY

(1970 data)

EDUCATIONAL FACILITIES

5 Elementary Schools: 3

Grades K - 4; I Grades

4 - 5; I Grades 4 - 6

Nearest Community College:

Nearest Public College: U-

niversity of Texas at Austin

stitute: Texas State Technical

Nearest Private College: St.

Nearest Public Technical In-

(1976 data)

Central Texas College

Edward's University

7 - 8

4,770 ADA

Institute

I Junior High School: Grades

I High School: Grades 9 - 12

Total Enrollment (Grades K - 12)

RECREATIONAL FACILITIES

MEDICAL FACILITIES

There are no hospitals in Copperas

Cove. However, a

hospital is under

construction at the

UTILITIES

Number of Parks: 2, total of 89 acres. Number of Tennis Courts: 1 Number of Athletic Fields: No Data Number of Golf Courses: 0

(1976 data)

present time. (1976 data) Number of Doctors: 1 (1974) Number of Dentists:

> 1 (1972) (The Copperas Cove area is served by Darnell Army Hospital at

Fort Hood.)

Electric Power: Electric power is supplied by the Texas Power and Light Co. The largest distribution line is 69.0 kv., and the second largest is 12.5 kv. Sewage: The city of Copperas Cove is the sewage disposal agency. Maximum rated capacity of system is 0.5 MGD. Average daily demand on system is 1.5 MGD. Peak daily demand on system is 2.0 MGD. Capacity of system in excess of daily demand is 1.0 MGD.

Water: The company supplying water for Copperas Cove is the Bell County Water Control and Improvement District. Maximum capacity for treatment is 3.0 MGD. Average daily demand on supply is 2.5 MGD. Peak daily demand is 3.0 MGD. Rated capacity in excess of average daily demand is 0.5 MGD. The largest water main is 16 inches with a pressure of 65 PSI. Plans exist for expansion as needed.

Gas: Natural gas supplier is Lone Star Gas Company. The largest size transmission line is 10 inches with a pressure of 500 PSI. The second largest line is 4.0 inches with a pressure of 40 PSI.

(1976 data)

Latest Census: 4,683 (1970) Current Estimated Population: 5,348 (1976) Projected Population 1980: 8,491

Number Owner Occupied: 1,218 Number Renter Occupied: 766 Number Vacant Year round: None Percent Single Family Units: 87.8 % Single Family Units for Rent: Multi-Family Apts. for Rent: Number of Subdivisions Under Development: 8

Total Number of Houses: 1,984 3 - 5 K - 2 Number of Single Unit Dwellings: I Junior High School: Grades 6 - 8 1,839 ADA ican Technological University (1970 data) Nearest Public Technical Institute:

(1976 data)

I Elementary School: Grades acres. I Primary School: Grades Number of Golf Courses: No Data | | High School: Grades 9 - 12 Total Enrollment (Grades K - 12) Nearest Community College: Central Texas College Nearest Public College: Tarleton State University Nearest Private College: Amer-

Texas State Technical Insti-

Number of Parks: 3, total of 25 Number of Tennis Courts: 2 Number of Athletic Fields: No Data

1 Hospital 44 Beds 4 Clinics Number of Doctors: 5 (1976)

Number of Dentists: 3 (1976) Doctors to Population Ratio: 1:1069

Dentists to Population Ratio: 1:1783

Electric Power: The company serving Gatesville is the Community Public Service Company. The largest distribution line serving the city is 22 kv. Sewage: The city controls sewage treatment and disposal. The maximum capacity of the

treatment system is 1.8 MGD.

Average daily demand on treat-

ment system is .38 MGD. Peak

daily demand is .48 MGD. Ca-

pacity in excess of average daily demand is 1.42 MGD. Water: The city of Gatesville is the controlling agency for water. Maximum treating capacity is 2.7 MGD. Average daily demand is 1.0 MGD. Peak daily demand is 1.5 MGD. Capacity in excess of average daily demand is 1.7 MGD. The largest water main is 12 inches with a pressure of 50 PSI. Plans for

Gas: Natural Gas is supplied by the Lone Star Gas Company. The diameter of the largest size transmission line is 6.0 inches with a pressure of 300 PSI. The second largest line is 4.0 inches and 35 PSI.

expansion exist as requirements

(1976 data)

warrant.

30 36' N. lat. 97 39' W. long.; PJ 2789

Latest Census: 6,395 (1970) Current Estimated Population: 8,395 (1975) Projected Population 1980: No Data

Total Number of Houses: 2,119 Number Owner Occupied: 1,224 Number Renter Occupied: 895 Number Vacant Year round: Number of Single Unit Dwellings: 1,869 Percent Single Family Units: 88.2 % Single Family Units for Rent:

(1970 data)

Multi-Family Apts. for Rent: Number of Subdivisions Under Development: 11

Institute (1976 data)

3 Elementary Schools: Grades I Junior High School: Grades 7 - 8 1 High School: Grades 9 - 12

Total Enrollment (Grades K - 12) 2,301 ADA Nearest Community College: Austin Community College Nearest Public College: University of Texas at Austin Nearest Private College: Southwestern University Nearest Public Technical Institute: Texas State Technical

Number of Parks: 4, total of 197 Number of Tennis Courts: 2 Number of Athletic Fields: No Data Number of Golf Courses: No Data

(1976 data)

1 Hospital 40 Beds A new hospital is planned for construction in 1976. Number of Doctors: 12 (1974)

Number of Dentists: 4 (1974) Doctors to Population Ratio: 1:700 Dentists to Population Ratio: 1:2099

Electric Power: Power is supplied by the Lower Colorado River Authority with 12.47 kv. and 41.6 kv. lines.

Sewage: The city of Georgetown is the agency controling sewage disposal. Maximum capacity of treatment plant is 1.7 MGD. Maximum daily use is 1.4 MGD. Average daily demand on system is .65 MGD. Capacity of system in excess of daily demand is .10

Water: The city of Georgetown controls the water supply from four wells. Maximum capacity for treatment is 6.0 MGD. Maximum daily use is 4.0 million gallons. Average daily demand is 3.4 MGD. Capacity in excess of average daily demand is 1.6 MGD. The largest main is 12.0 inches in diameter with a pressure of 70 PSI. Plans for future expansion exist as demand increases.

Gas: Natural gas is supplied by the Lone Star Gas Company. The largest distribution line is 6.0 inches with 390 PSI. The second largest line is 3.0 inches with 30 PSI.

(1976 data)

| NAME AND LOCATION | POPULATION | HOUSING AVAILABILITY | EDUCATIONAL FACILITIES | RECREATIONAL FACILITIES | MEDICAL FACILITIES | UTILITIES |
|--|---|--|--|---|---|---|
| 7. Hamilton, Tx. 31 40 ¹ N. lat. 98 07 ¹ W. long.; NL 8308 | Latest Census: 2,760 (1970) Current Estimated Population: 2,812 Projected Population 1980: 3,687 | Total Number of Houses: 1,272 Number Owner Occupied: 837 Number Renter Occupied: 435 Number Vacant Year round: None Number of Single Unit Dwellings: 1,192 Percent Single Family Units: 93.71 \$ Single Family Units for Rent: 15 Multi-Family Apts. for Rent: 6 Number of Subdivisions Under Development: 5 (1970 data) | I Elementary School: Grades K - 8 Junior High School: None I High School: Grades 9 - 12 Total Enrollment (Grades K - 12) 659 ADA Nearest Community College: Central Texas College Nearest Public College: Tarleton State University Nearest Private College: Howard Payne University Nearest Public Technical Institute: Texas State Technical Institute (1976 data) | Number of Parks: 2, total of 60 acres. Number of Tennis Courts: 5 Number of Athletic Fields: 2 Number of Golf Courses: 1, 18 hole (1976 data) | 1 Hospital 49 Beds Special facilities include one Intensive Care Unit. Number of Doctors: 2 (1976) Number of Dentists: 2 (1972) Doctors to Population Ratio: 1:1406 Dentists to Population Ratio: 1:1406 | Electric Power: Electric power is distributed by the Community Public Service Company. The largest distribution line is 22.0 kv. Sewage: Sewage disposal is provided by the city of Hamilton. The maximum rated capacity of the treatment system is 1.5 MGD. Average daily demand is .35 MGD. Peak daily demand is 1.0 MGD. Capacity in excess of daily demand is 1.15 MGD. Water: The water source is Proctor Lake and is part of the Upper Leon River District. Maximum daily use is 1.0 MGD. Overhead storage capacity is 286,000 gallons. Ground storage capacity is 250,000 gallons. There are two mains in the looped system. The size of mains are 4.0 and 12.0 inches. Pressure is 35 PSI. Gas: Gas is supplied by the Lone Star Gas Company. The diameter of the largest distribution line is 6.0 inches with a pressure reading of 300 PSI. A secondary line is 4.0 inches in diameter, and a pressure reading of 20 PSI. (1976 data) |
| 8. Harker Heights, Tx. 31 04' N. lat. 97 41' W. long.; PK 2740 | Latest Census: 4,216 (1970) Current Estimated Population: No Data Projected Population 1980: No Data | Total Number of Houses: 1,336 Number Owner Occupied: 730 Number Renter Occupied: 606 Number Vacant Year round: None Number of Single Unit Dwellings: 572 Percent Single Family Units: 42.81 % Single Family Units for Rent: 80 Multi-Family Apts. for Rent: 140 Number of Subdivisions Under Development: 4 (1970 data) | 1 Elementary School: Grades K - 6 Harker Heights Elementary School is the only school in the city. All other grades go to the Killeen Independent School District. Nearest Community College: Central Texas College Nearest Public College: University of Texas at Austin Nearest Private College: American Technological University Nearest Public Technical Institute: Texas State Technical Institute (1976 data) | Number of Parks: 3, total of 7.0 acres Number of Tennis Courts: 2 Number of Athletic Fields: No Data Number of Golf Courses: No Data (1976 data) | There are no hospitals or clinics in Harker Heights as of November, 1976. No Doctors or Dentists practicing in Harker Heights as of 1974 data. (The Harker Heights area is served by Darnell Army Hospital at Fort Hood.) | Electric Power: Electric Power is supplied by the Texas Power and Light Company. The largest distribution line is 12.5 kv. The second largest line is also 12.5 kv. Sewage: Sewage disposal is maintained by the Water Control and Improvement District no. 4. Maximum capacity of treatment plant is 1.5 MGD. Average daily demand is 1.0 MGD and the peak daily demand is also 1.0 MGD. The capacity for treatment in excess of average daily demand is .50 MGD. Water: Water is supplied by the Water Control and Improvement District no. 4. Maximum treating capacity is 2.50 MGD. Average daily demand is .95 MGD. Peak daily demand is 1.2 MGD. Capacity of water system in excess of average daily demand is 1.55 MGD. Largest water main is 12.0 inches in diameter with 95 PSI. Plans for expansion have been made to accommodate future demands. Gas: Natural gas is supplied by the Lone Star Gas Company. The largest line is 10.0 inches in diameter with 300 PSI. Second largest line is 3.0 inches with 25 PSI. (1976 data) |
| 9. Killeen, Tx. 31 06' N. lat. 97 44' W. long.; PK 2244 | Latest Census: 35,507 (1970) Current Estimated Population: 45,358 (1975) Projected Population 1980: No Data | Total Number of Houses: 12,285 Number Owner Occupied: 4,601 Number Renter Occupied: 7,684 Number Vacant Year round: None Number of Single Unit Dwellings: 6,776 Percent Single Family Units: 55.16 % Single Family Units for Rent: 2,900 Multi-Family Apts. for Rent: 8,000 Number of Subdivisions Under Development: 12 (1970 data) | 14 Elementary Schools: Grades -6; 13 Grades K - 6 5 Junior High Schools: Grades 7 - 9 1 High School: Grades 10 - 12 13,838 ADA Nearest Community College: Cent Texas College Nearest Public College: University Nearest Private College: American Technological University Nearest Public Technical Institute: Texas State Technical Institute Texas State Technical Institute Texas State Technical Institute Texas State Technical Institute Texas Texas | 307 acres Number of Tennis Courts: 29 Number of Athletic Fields: No Data Number of Golf Courses: 1, 18 hole) (1976 data) tral sity | 1 Hospital 35 Beds Number of Doctors: 5 Number of Dentists: 4 Doctor to Population Ratio: 1:9072 Dentist to Population Ratio: 1:11339 (The Killeen area is served by Darnell Army Hospital at Fort Hood.) | Electric Power: Electric Power is supplied by the Texas Power and Light Company. The largest size distribution line is 12.5 kv. Sewage: Sewage disposal service is supplied by the Bell County Water Control and Improvement District. Maximum capacity of treatment system is 9.0 MGD. Average daily demand on system is 5.5 MGD. Peak daily demand is 6.7 MGD. Rated capacity in excess of average daily demand is 3.5 MGD. Water: Water is supplied by the Bell County Water Control and Improvement District. Maximum treat- |

(1976 data)

(1976 data)

used as needed.

provement District. Maximum treat-

ing capacity of water system is 25.0 MGD. Average daily demand is

5.40 MGD. Peak daily demand is 8.96 MGD. Rated capacity in excess of average daily demand is 19.6 MGD. The largest water main is 16.0 inches

in diameter with a pressure of 70 PSI. Plans for future expansion are

Gas: Natural gas is supplied by the Lone Star Gas Company. The largest gas line is 10.0 inches in diameter and has a pressure of 300 PSI. The second largest line is 6.0 inches and 25 PSI.

NAME AND LOCATION

10. Lampasas,

31 02' N. lat.

NK 7838

98 12' W. long.;

POPULATION

Latest Census:

Population:

10,000

1980:

5.922 (1970)

6,500 (1975)

Projected Population

Current Estimated

HOUSING AVAILABILITY

Total Number of Houses: 2,500

Number Renter Occupied: 1.031

Number Vacant Year round: None

Number of Single Unit Dwellings:

Number Owner Occupied: 1.469

Percent Single Family Units:

Single Family Units for Rent:

Multi-Family Apts. for Rent:

Number of Subdivisions Under

Development: 10

(1970 data)

90.35 %

EDUCATIONAL FACILITIES

3 - 5; I Grades K - 2

2,099 ADA

Institute

Texas College

of Texas at Austin

I Junior High School: Grades

I High School: Grades 9 - 12

Total Enrollment (Grades K - 12)

Nearest Community College: Central

Nearest Public College: University

Nearest Private College: American

stitute: Texas State Technical

Technological University

Nearest Public Technical In-

(1976 data)

2 Elementary Schools: I Grades

RECREATIONAL FACILITIES

Number of Parks: 5, total of

Number of Tennis Courts: 8

Number of Golf Courses: I

Number of Athletic Fields: 3

(1976 data)

134 acres

MEDICAL FACILITIES

1 Hospital (Rollings-Brook Hospital)

36 Beds

The Medical staff has 3 family practitioners, one internal medicine physician, and one general surgeon on call. Consulting radiologists visit three days each week. Other consultants on the courtesy staff include family practitioners, pathologists, urologists, dentists, and gynecologists.

Number of Doctors: 4 (1976) Number of Dentists: 3 (1976)

Doctors to Population Ratio: 1:1300 Dentists to Population ratio: 1:2167

UTILITIES

Electric Power: The principle supplier of electrical energy is the Lower Colorado River Authority. The existing primary distribution system consists of two systems. A 12.5 kv. system and a 4.2 kv. system. Provisions are made for several 12.5 kv. feeders which could be incorporated within future plans for the distribution system. Sewage: Glover Disposal Plant: 2-stage trickling filter. Treats 500,000 GPD. Another plant completed in

1974 is a contact-stabilization process. It treats 500,000 GPD also. Under present conditions, the sewage system is adequate. Collection facilities will need to be upgraded as necessity dictates.

Water: The city of Lampasas controls the water supply from Sulfur Creek, which is a spring-fed river supplying about 2.5 to 3.0 MGD. Maximum treating capacity is 3.5 MGD. Average daily demand is 1.25 MGD. Peak daily demand is 3.5 MGD. Capacity in excess of average daily demand is 2.25 MGD. The largest main is 12.0 inches with 60 PSI. Plans have been made to meet future expansion. Gas: Natural Gas is supplied by the Lone Star Gas Company through a 6.0 inch transmission line with 325

PSI. Another 4.0 inch line with 12 PSI serves the city. Approximately 46.8 MCF (million cubic feet) is used monthly.

(1976 data)

II. Marble Falls, Tx. 30 32' N. lat. 98 17' W. long.; NJ 6983

Latest Census: 2,209 (1970) Current Estimated Population: 2,800 (1976) Projected Population 1980: No Data

Total Number of Houses: 856 Number Owner Occupied: 569 Number Renter Occupied: 287 Number Vacant Year round: 78 Number of Single Unit Dwellings:

Percent Single Family Units: 85.05 % Single Family Units for Rent: Multi-Family Apts. for Rent:

Number of Subdivisions Under

(1970 data)

Development: 7

| Elementary School: Grades K - 5 I Junior High School: Grades 6 - 8I High School: Grades 9 - 12 Total Enrollment (Grades K - 12)

1,196 ADA Nearest Community College: Austin Community College Nearest Public College: University of Texas at Austin Nearest Private College: St. Edward's University Nearest Public Technical Institute: Texas State Technical

(1976 data)

Institute

Number of Parks: 2, total of 15 acres Number of Tennis Courts: 6 Number of Athletic Fields: No Data Number of Golf Courses: No Data

There are no hospitals in Marble Falls as of 1975 data. 1 Nursing Home 110 Beds Number of Doctors:

2 Number of Dentists:

Doctor to Population Ratio: 1:1400 Dentist to Population Ratio: 1:2800

Electric Power: Electric Power is supplied by the Perdenales Electric Co-op. The largest distribution line is 125 kv. Sewage: The city of Marble Falls supplies sewage treatment and disposal. Maximum capacity of treatment plant is 0.5 MGD. Average daily demand is .20 MGD. Peak daily demand is .38 MGD, and capacity in excess of average daily demand is 0.3 MGD.

Water: The city of Marble Falls supplies all water needs. Maximum treating capacity is 1.0 MGD. Average daily demand is 0.5 MGD. Peak daily demand is .80 MGD. Capacity of water system in excess of average daily demand is 0.5 MGD. Largest water main is 10.0 inches with 95 PSI. Plans have been made for future expansion.

Gas: Natural gas is supplied by the Lone Star Gas Company. The largest line is 4.0 inches and 450 PSI. The second largest line is 3.0 inches and 25 PS1.

12. McGregor, Tx. 31 25' N. lat. 97 26' W. long.; PK 5279

Latest Census: 4,365 (1970) Current Estimated Population: No Data Projected Population 1980: No Data

Total Number of Houses: 1,551 Number Owner Occupied: 1,036 Number Renter Occupied: 515 Number Vacant Year round: None Number of Single Unit Dwellings: 1,454 Percent Single Family Units: 93,75 % Single Family Units for Rent:

Multi-Family Apts. for Rent: Number of Subdivisions Under Development: 2

(1970 data)

1 Elementary School: Grades K - 5 I Junior High School: Grades 6 - 8 | I High School: Grades 9 - 12 Total Enrollment (Grades K - 12) 1,051 ADA Nearest Community College:

Mclennan County Community Coll-Nearest Public College: Tarleton State University Nearest Private College: Baylor University Nearest Public Technical Institute: Texas State Technical Institute

(1976 data)

Number of Parks: 4, total of 30 acres

Number of Tennis Courts: 3 Number of Athletic Fields: No Data Number of Golf Courses: No Data

(1976 data)

There are no hospitals in Mc-Gregor as of 1975 data. Number of Doctors:

Number of Dentists:

Doctor to Population Ratio: 1:2183 Dentist to Population Ratio: 1:4365

Electric Power: Electric power is supplied by the Texas Power and Light Company. Largest distribution line is 24.0 kv. The second

largest is 69.0 kv. Sewage: Sewage disposal is supplied by the city of McGregor. Maximum capacity of treatment system is 0.74 MGD. Average daily demand is 0.65 MGD. Peak daily demand is 0.71 MGD. Capacity in excess of average

daily demand is 0.09 MGD. Water: Water is supplied by the city of McGregor. Maximum treating capacity is 0.97 MGD. Average daily demand is 0.61 MGD. Peak daily demand is 1.50 MGD. Capacity in excess of average daily demand is 0.36. Largest water main is 8 inches with 50 PSI. Plans have been made for future

expansion. Gas: Natural gas is supplied by the Lone Star Gas Company. Largest transmission line is 8.0 inches with 300 PSI. The second largest is 6.0 inches with 75 PSI.

•

| NAME AND LOCATIO |
|---|
| 13. Taylor, Tx.30 33' N. lat.97 26' W. long.;PJ 5283 |
| |
| |
| |
| |
| |
| |
| 14. Temple, Tx. |
| 31 04 ¹ N. lat. 97 22 ¹ W. long.; PK 5842 |
| |

POPULATION

Latest Census: 9,616 (1970) Current Estimated Population: 9,850 (1973) Projected Population 1980:

3,114 No Data 89.79 % Single Family Units for Rent:

Total Number of Houses: 3,468 Number Owner Occupied: 2,270 Number Renter Occupied: 1,198 Number Vacant Year round: None Number of Single Unit Dwellings: | High School: Grades 9 - 12 Percent Single Family Units:

HOUSING AVAILABILITY

Multi-Family Apts. for Rent: Number of Subdivisions Under Development: 7 (1970 data)

Institute

EDUCATIONAL FACILITIES

3 Elementary Schools: I Grades 3 - 4; 2 Grades K - 2 I Junior High School: Grades 5 - 8 Total Enrollment (Grades K - 12) 2,015 ADA Nearest Community College: Austin Community College Nearest Public College: University of Texas at Austin Nearest Private College: St. Edward's University Nearest Public Technical Institute: Texas State Technical

(1976 data)

RECREATIONAL FACILITIES

Number of Parks: 2, total of 80 Number of Tennis Courts: 14 Number of Athletic Fields: No Data Number of Golf Courses: No Data

(1976 data)

MEDICAL FACILITIES

1 Hospital 65 Beds Number of Doctors:

Number of Dentists: Number of Surgeons:

Doctor to Population Ratio: 1:3283 Dentist to Population Ratio: 1:1231

UTILITIES

Electric Power: Electricity is supplied by Texas Power and Light Company. Largest distribution line is 12.5 kv. The second largest line is 7.2 kv. Sewage: Sewage treatment and disposal is supplied by the city of Taylor. Maximum capacity of sewage treatment system is 5.25 MGD. Average daily demand on system is .80 MGD. Peak daily demand is .90 MGD. Rated capacity in excess of average daily demand is 4.45 MGD.

Water: Water is supplied by the city of Taylor. The average daily demand is on the system is 1.5 MGD. The peak daily demand is 3.09 MGD. Capacity in excess of average daily demand is 4.20 MGD. The largest water main is 12.0 inches with 68 PSI. Plans have been made for future expansion.

Gas: Natural gas is supplied by the Lone Star Gas Company. The largest distribution line is 30 inches in diameter and 750 PSI. The second largest line is 20 inches with 275 PSI.

(1976 data)

Latest Census: 33,431 (1970) Current Estimated Population: 45,700 Projected Population 60,000

Total Number of Houses: 11,853 9,258 78.11 %

Percent Single Family Units: No Data Multi-Family Apts. for Rent: Number of Subdivisions Under

(1970 data)

14 Elementary Schools: 11 Grades K - 5; 2 Grades 1 -Number Owner Occupied: 7,362 6; 1 Grades 3 - 5 Number Renter Occupied: 4,491 Number Vacant Year round: 3 3 Junior High Schools: Grades Number of Single Unit Dwellings 6 - 8 1 High School: Grades 9 - 12 Total Enrollment (Grades K - 12) 7,351 ADA Single Family Units for Rent: Nearest Community College: Temple Community College Nearest Public College: University of Texas at Austin Nearest Private College: Mary Hardin Baylor College Development: 6 Nearest Public Technical In-

(1976 data)

Institute

stitute: Texas State Technical

Number of Parks: 24, from 1.0 - 12.3 acres Number of Tennis Courts: 10 Number of Athletic Fields: 12 Number of Golf Courses: 4

(1976 data)

SEE BELOW

Electric Power: Texas Power and Light Company. Six transmission lines; two 138 kv, and

four 69 kv. Sewage: Maximum capacity of sewage treatment system is 7.5 MGD. Average daily demand is 2.70 MGD. Peak daily demand is 5.0 MGD. Capacity in excess of average daily demand is 4.80

Water: Municipal system supplied from a 1,097,600 acre-feet reservoir on the Leon River. Present pumping capacity is 14 MGD. Storage capacity is 10.5 million gallons. Average daily demand is 11.0 MGD. Peak daily demand is 15.30 MGD. Capacity in excess of average daily demand is 6.0 MGD. Largest water main is 30 inches with 80 PSI. Gas: Supplied by Lone Star Gas Company. Gas furnished to city limits at 500 pounds PSI through 20.0 inch transmission line. Second largest line is 6.0 Inches and 20 PSI.

(1976 data)

MEDICAL FACILITIES

King's Daughters Hospital: King's Daughters Hospital is a 100 bed, short-term general hospital. The present hospital facilities were constructed and occupied on January 31, 1975. Services provided in addition to general, surgical, medical, obstetrical and pediatric nursing care units are: Intensive-Coronary Care Unit, Neo-Natal Intensive Care Unit, 24-hour Emergency Room Service, Operating Rooms, Recovery Rooms, as well as diagnostic and treatment areas such as Radiology (X-Ray), Pathology (Laboratory), Blood Bank, Nuclear Medicine, Physical Therapy, Electrocardiography, Electroencephalography, and operates a Cancer Registry that is approved by the American College of Surgeons.

King's Daughters Clinic: At the present time there are 14 members of the King's Daughters Clinic group, providing services in the following areas of medical practice: Internal Medicine, Family Practice Medicine, Pediatrics, General Surgery, Thoracic Surgery, Cardio-Vascular Surgery, Orthopedics, Urology, Radiology, Pathology, Obstetrics, Gynecology. Plans are to increase the current number of physicians in the King's Daughters Clinic group from 14 to 20 members and the adding of certain specialities that are not now provided. Facilities: General Medical and Surgical, Maternity Unit, Premature Nursery, Emergency Department, Intensive Care Unit, X-Ray Therapy, Blood Bank, Physical Therapy, Respiratory Therapy.

Santa Fe Memorial Hospital: Santa Fe Memorial Hospital, with 137 beds, was originally established in Temple to serve employees of the Santa Fe Railroad, but is now an open staff hospital. Facilities: General Medical and Surgical, Intensive Care Unit, Radiology Services, Pathology Services, Physical Therapy, Respiratory Therapy, Hospital Volunteer Services.

Veterans Administration Center: Facilities: General Medical and Surgical, Psychiatric, (In-Patient and Out-Patient), Emergency Department, Organized Outpatient Department, Dental Services, Intensive Care Unit, Radiology Services, Pathology Services, Blood Bank, Occupational Therapy, Physical Therapy, Respiratory Therapy, Speech Therapy, Renal Dialysis, Hospital Volunteer Service.

Scott and White: Scott and White is a nonprofit multidimensional health care institution serving patients from Texas and from the United States, Canada and Mexico. The full-time staff includes some 145 physicians and medical scientists, about 225 professional nurses, and extensive

Scott and White Memorial Hospital: Scott and White Memorial Hospital is a 500 bed general hospital focusing on all aspects of medicine-diagnosis, treatment, rehabilitation, research and

Scott and White Clinic: The main hospital and clinic buildings were completed in 1963. The clinic houses offices for all staff physicians, along with outpatient facilities for the practices of virtually every specialty known to modern medicine. Corridors connecting the clinic and the main hospital building provide quick and easy flow of patients, doctors and other staff. A new Diagnostic Center, now under construction, will allow space for 40 additional physicians with the necessary laboratory and support areas. This building will open in 1979. Scott and White Memorial Hospital and Scott and White Clinic: 492 beds and 24 bassinets, short term, not-for-profit, gen-

eral, teaching hospital and multi-specialty diagnostic outpatient clinic. Scott and White Clinic Specialties: Allergy - Immunology, Anesthesiology, Cardiology, Clinical Pathology, Community Internal Medicine, Dermatology, Endocrinology, Gastroenterology and Proctology, General Medicine, General Surgery, Hematology-Oncology, Infectious Disease, Medical Diseases of the Chest, Nephrology, Neurology, Neurosurgery, Obstetrics and Gyneocology, Ophthalmology, Oral Surgery, Orthopedic Surgery, Otolaryngology, Pediatrics, Plastic Surgery, Psychiatry, Radiology, Rheumatology, Emergency Care, Surgical Pathology, Urology, 83 Residents and Interns, Maternity Unit, Premature Nursery, Emergency Department, Organized Outpatient Department, Dental Services, Podiatry Services, Intensive Care Unit, Open Heart Surgery, X-Ray Therapy, Cobalt Therapy, Pathology Services, Radiosotope Services, Blood Bank, Occupational Therapy, Physical Therapy, Respiratory Therapy, Speech Therapy, Renal Dialysis, Hospital Volunteer Service, Social Services. Veterans Administration Center: Facilities: General Medical and Surgical, Psychiatric

UTILITIES HOUSING AVAILABILITY EDUCATIONAL FACILITIES RECREATIONAL FACILITIES MEDICAL FACILITIES NAME AND LOCATION POPULATION (see below) Electric Power: Supplied by 15. Waco, Tx. Latest Census: Total Number of Houses: 52, 529 23 Elementary Schools: 2 Number of Parks: 34, 906 the Texas Power and Light Com-31 31' N. lat. 95,326 (1970) Number Owner Occupied: 18,993 Grades K - 6; 21 Grades acres Developed; 372 acres pany which is part of the Number Renter Occupied: 33,536 97 08' W. long.; Current Estimated 1 - 5 undeveloped Texas Utilities Company system. PK 7593 Population: Number Vacant Year round: 24 6 Junior High Schools: 3 Number of Tennis Courts: 32 Two major generating plants 103,548 Number of Single Unit Dwellings: Grades 6 - 9; | Grades 7 -Number of Athletic Fields: No Data are located in the Waco area. Projected Population 8; 2 Grades 8 - 9 Number of Golf Courses: 3 27,124 A 345 kv. transmission line in-1980: Percent Single Family Units: 4 High Schools: 1 Grades 9 terconnects generating facil-No Data 51.64 % (1976 data) 12; 3 Grades 10 - 12 ities. There are no plans Single Family Units for Rent: Total Enrollment (Grades K - 12) for expansion at the present 14,418 ADA time. Muiti-Family Apts. for Rent: Nearest Community College: Sewage: Two sewage plants 1,542 Mclennan Community College are operated by the Brazos River Number of Subdivisions Under Enrollment Fall 76 -Authority. Primary plant has Development: 98 3,611 treatment capacity of 14.0 MGD. Projected Enrollment 1980 -The secondary plant has a treat-(1970 data) 3,970 ment capacity of 2.5 MGD. im-Nearest Public College: Texas provements are planned and sched-A & M University uted as needed. Nearest Private College: Baylor Water: Primary source is Lake University Waco. Safe yield per day is 89 Enrollment Fall 76 - 8,947 million gallons. Current peak Projected Enrollment 1980 consumption is 41 MGD. Average 9.000 daily consumption is approx-Nearest Public Technical Inimately 21.5 MGD. Rated castitue: Texas State Technical pacity of treatment plants is Institute 50 MGD, with overload capacity to 70 MGD. Storage area is 19.5 MG. (1976 data) Trinity and Woodbine sand formations provide adequate ground water. There are no plans for expansion at present time. Gas: Natural gas is supplied by the Lone Star Gas Company. More than 20,000 wells in Texas and Oklahoma supply Lone Star Gas Company. The city's transmission system is semi-looped with service through four primary gate stations and connected with one 20 inch and four 12 inch high pressure lines. Storage capacity is 86.8 billion cubic feet. Maximum daily withdrawel is 700 million cubic feet. Supply is adequate to serve present markets and prospective growth.

Providence Hospital: Total number of beds is 245 (potential figure). Facilities at the hospital include: X-ray; clinical laboratory, heart clinic, emergency room, medical library, intensive care (medical, surgical, coronary), psychiatric service, inhalation therapy, pathology department, cardiopulmonary department, nuclear medicine department, coronary care unit, openheart surgical suite, and special procedures room for the diagnosis of cardiovascular diseases and neurosurgery. The hospital has just completed a 7.5 million dollar improvement program increasing the bed capacity from 186 to a potential of 245. All services have been updated. No other expansions are planned for the near future.

Francis Hospital: Francis Hospital is a convalescent facility with a 66 bed capacity. Régistered nurses are on duty 24 hours a day. Facilities include special diet kitchen, physical therapy, and inhalation therapy. The hospital emphasizes rehabilitation so that patients may return to active life, but the facility is also designed for permanent residence.

Veterans Administration Hospital: The Veterans Administration Hospital has 1,184 beds total of which 732 are psychiatric, 368 are medical and 84 nursing. There are 47 permanent staff medical doctors, and 150 nurses in training. At present, 25 training agreements exist with other hospitals and universities. 1,400 employees support the functions of the hospital. Special facilities include a respiratory care unit combined with pulmonary care; Day hospital (day treatment center); mental hygiene clinic, blind psychiatric clinic, radiology laboratory, rehabilitation, medicine service, and alcohol treatment clinic. At present, the entire facility is being remodelled with air conditioning and new fire protection designs. A five year plan ending in fiscal year 1979 is budgeted for \$14 million. This includes a \$2 million dietetic kitchen, a \$0.5 million steam distribution system, and a medical warehouse.

Hillcrest Baptist Hospital: Total number of beds is 368. Special facilities include: surgery unit with nine major operating rooms; radiology department; intensive care unit with 18 bed capacity; emergency room; anatomic pathology lab; coronary care unit; nuclear medicine department; physical therapy department; respiratory therapy department; OB/GYN unit; pediatric unit; and day surgery unit for minor surgery. The present physical plant is designed to allow extra and expanded buildings to be added. The long range plan is based on 750 beds with all necessary facilities.

Woodway, Tx. 31 31' N. lat. 97 08' W. long.; PK 7598

Latest Census: 4,819 (1970) Current Estimated Population: 5,500 (1973) Projected Population No Data

Total Number of Houses: 1,368 Number Owner Occupied: 1,248 1,356

Number Renter Occupied: 120 Number Vacant Year round: 51 Number of Single Unit Dwellings: Percent Single Family Units: 99.12 % Single Family Units for Rent: No Data Multi-Family Apts. for Rent: No Data Number of Subdivisions Under Development: No Data (1970 data)

Enrollment figures for Woodway are incorporated within the Waco Independent School District.

Number of Parks: No Data Number of Tennis Courts: No Data Number of Athletic Fields: No Data Number of Golf Courses: No Data

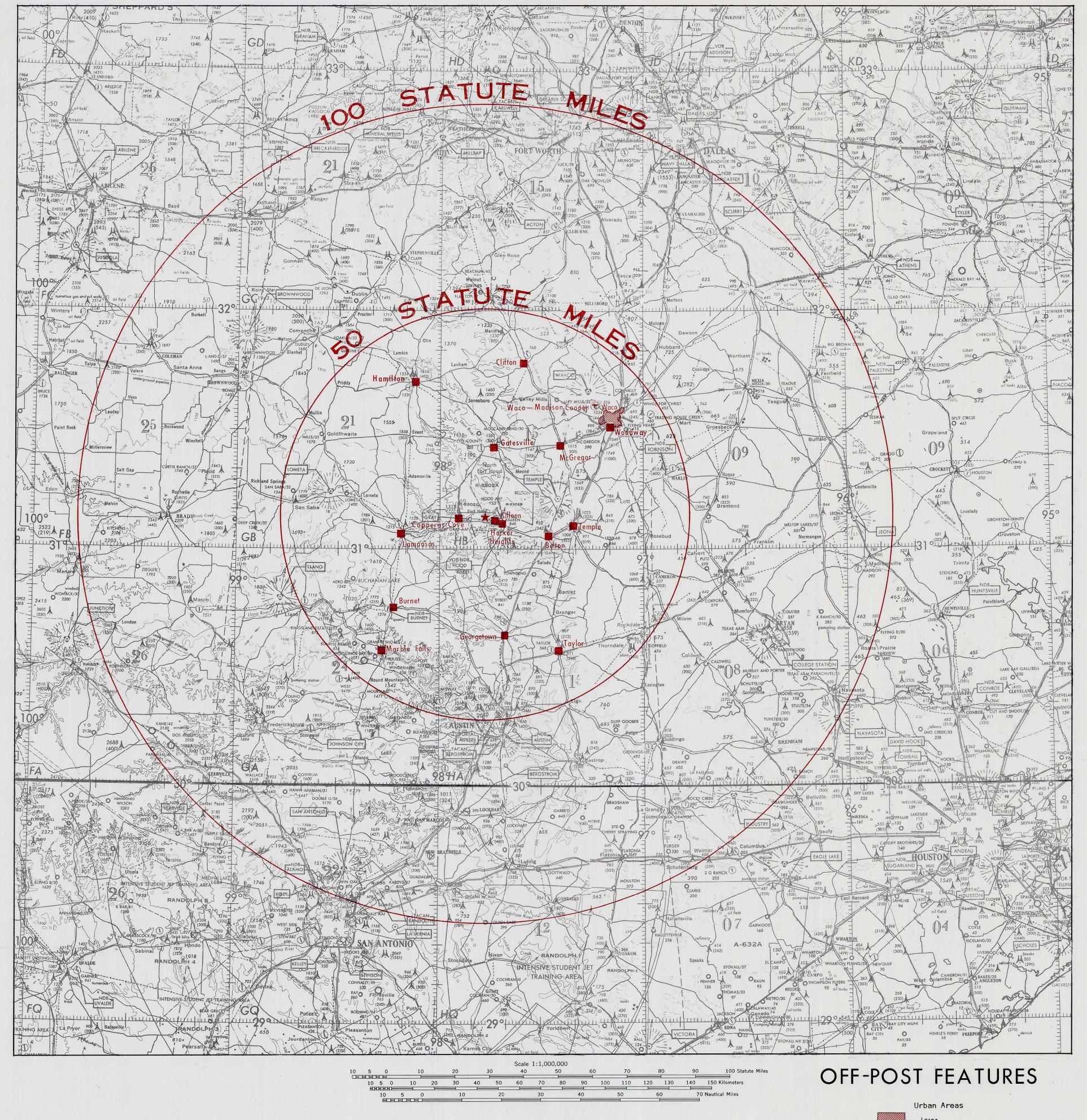
No Data

No Data

NOTE: All public school enrollments are 1976 - 77 ADA, (average daily attendance) figures of the Texas Education Agency. The ADA is slightly lower than the actual enrollment.

FORT HOOD, TEXAS TERRAIN ANALYSIS

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